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PREFACE

Agricultural Finance Review provides a forum for presentation of research and discussion of issues in agricultural finance. The regular annual publication contains articles contributed by scholars in the field and refereed by peers. This issue, however, is a special issue containing the papers presented at the Financial Stress in Agriculture Symposium held at the Federal Reserve Bank of Kansas City November 24 and 25, 1986.

The Kansas City symposium was organized by the American Agricultural Economics Association Task Force on Financial Stress in Agriculture as a means of focusing on the financial problems of U.S. agriculture and agricultural lenders. Papers were commissioned to highlight the major issues and policy responses. The papers are presented in this issue in the order they were given at the symposium.

Major responsibility for the planning and organization of the symposium was handled by Michael Boehlje, University of Minnesota. Mark Drabenstott, research officer and economist, Federal Reserve Bank of Kansas City, handled local arrangements. Major financial support for publication of this issue was provided by the Economic Research Service, U.S. Department of Agriculture.

The AAEA Task Force on Financial Stress in Agriculture includes the following members:

Michael Boehlje, University of Minnesota
Hoy Carman, University of California, Davis
Gregory Hanson, ERS-USDA
Robert Jolly, Iowa State University
Warren Lee, Ohio State University
David Lins, University of Illinois
Emanuel Melichar, Board of Governors, Federal Reserve System
John Penson, Texas A & M University
John Brake, Cornell University, Chair of the Task Force

Financial Conditions of the Farm Sector and Farm Operators

James D. Johnson, Mitchell J. Morehart, and Kenneth Erickson

Financial Profile of the Farm Sector

Estimates of the farm sector's income and balance sheet provide a perspective on the financial performance of farm businesses, returns earned by resources used in farm production, and the earnings of individuals and households who either invest in or are employed by production agriculture. Aggregate sector estimates also provide a foundation for understanding the diversity that exists in the financial circumstances of farmers.

Trends in farm income

The sector's net income position is given in Table 1. The data indicate that nominal net income has recovered from relatively low levels earned during the 1977–83 period to more nearly resemble the levels earned during the 1973–75 period. Real net farm income for 1985 exceeded the average income level attained during the 1980–83 period by more than 30 percent but remained well below real income levels earned during the early and mid-1970s. Real net cash income also trended downward between 1979 and 1984. Since 1984, however, real net cash income has increased modestly, although the level for 1985 still remained well below the level earned by farmers during the first half of the 1970s.

The data for 1986 and 1987 are forecasts based on cost and return prospects for individual commodities, production expenses, and government programs. Those projections suggest that, in nominal terms, net farm income for 1986 will likely decrease from its 1985 level, while net cash earnings will remain relatively stable. Forecasts for 1987 indicate that cash income may rise in both nominal and real terms. Real net cash income may exceed the $40 billion level for the first time since 1979 and could reach levels earned prior to the rapid expansion in real net cash income in 1972. Real net farm income levels for 1987 may also improve over those expected for 1986 despite the continued drop in market receipts.

The income outlook is heavily dependent on government loan, storage, and direct payment programs and the prospects for changes in production expenses. Direct government payments may rise to more than $12 billion in 1986 and could exceed $15 billion in 1987. Meanwhile, production expenses are expected to continue the contraction that began in 1985 due to reductions in farm input use and relative stability in input prices. Both factors are important, especially since the drop in production expenses may exceed the drop in receipts for the third consecutive year. If the 1987 forecast holds, expenses will have declined by 12 percent, or nearly $17 billion. From 1985 through 1987 the drop in production expenses and the increase in government payments are primary reasons for expecting real net income levels to improve somewhat over their early 1980s level.

Change in Assets and Debts

The balance sheet of the farm sector has shown more deterioration than its income. The value of farm assets rose at an average annual rate of about 7 percent through the 1960s and early 1970s, peaking at more than $1 trillion in 1981 (Figure 1). The large increase in asset values overshadowed the rise in farm sector debt from $24 billion in 1960 to $60 billion in 1972, an increase of more than 150 percent. And between 1972 and 1982, debt more than tripled, peaking at nearly $204 billion (excluding households). Thus farm sector equity exploded between

James D. Johnson, Mitchell J. Morehart, and Kenneth Erickson are agricultural economists with the Economic Research Service, U.S. Department of Agriculture.

Table 1. Farm Sector Income, 1970–87

Year	Cash Receipts	Direct Government Payments	Production Expenses	Net Cash Income[a]		Net Farm Income[a]	
				Nominal	Deflated	Nominal	Deflated
1970	50.5	3.7	44.5	18.4	43.7	14.4	34.2
1971	52.7	3.1	47.1	18.0	40.6	15.0	33.8
1972	61.1	4.0	51.7	23.2	49.8	19.5	41.8
1973	86.9	2.6	64.6	36.0	72.6	34.4	69.4
1974	92.4	0.5	71.0	34.8	64.5	27.3	50.5
1975	88.9	0.8	75.0	29.6	49.9	25.5	43.1
1976	95.4	0.7	82.7	29.9	47.4	20.2	32.0
1977	96.2	1.8	88.9	27.8	41.4	19.9	29.5
1978	112.2	3.0	103.2	33.1	45.9	25.2	34.9
1979	131.5	1.4	123.3	33.4	42.5	27.4	34.9
1980	139.7	1.3	133.1	34.2	39.9	16.1	18.8
1981	141.6	1.9	139.4	32.8	34.9	26.9	28.6
1982	142.6	3.5	140.7	36.8	36.8	22.7	22.7
1983	136.5	9.3	139.5	37.1	35.7	13.0	12.5
1984	142.2	8.4	141.7	39.3	36.4	32.7	30.3
1985	142.1	7.7	136.1	44.0	39.5	30.5	27.3
1986[b]	132.2	12.9	128.9	44.2	38.6	28.8	25.1
1987[b]	130.0	15.7	124.7	47.9	40.5	32.1	27.2

[a]Deflated by the GNP implicit price deflator, 1982 = 100. [b]Forecast.

1973 and 1980, rising from $281 billion to a peak of $833 billion in 1980.

Since 1981, farm assets have declined by 23 percent to a level of $771.4 billion at the end of 1985. Farm debt dropped by only 6 percent between 1982 and 1985, and so equity values contracted by 25 percent. In constant (1982) dollars, equity in 1985 was $588 billion, 27 percent lower than its 1980–84 average but still above its level prior to the mid-1970s.

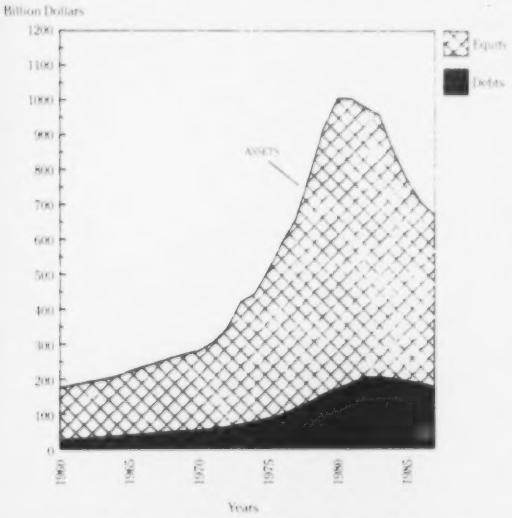


Figure 1. Farm Sector Assets, Debt, and Equity—Excluding Dwellings, 1960–87

Trends in Returns and Cash Flow

Changes that have occurred in the sector's income and balance sheet have altered both the ability to service debt out of current earnings and the returns earned by assets and equity. When measured before payment of interest, and in constant dollars, cash flow is down from the peak boom years of the 1970s but has remained above preboom levels (Table 2). Before interest payments, both cash flow and returns to farm assets have fluctuated widely, but their levels have not changed much since the early 1980s and have remained above the levels of the 1960s. The data broadly represent the earnings experience of farmers with little or no debt who saw their real returns rise during the boom years of the 1970s and in recent years remain above preboom levels.

Reflecting both the rise in debt outstanding of more than 60 percent in real terms and the increase in real interest rates, interest payments rose by nearly 260 percent from the beginning of the 1970s through the early 1980s. Thus, after interest cash flow has been well below the levels earned from 1972 to 1979 and especially below the level of the 1972–74 boom period. Aggregate return on equity from farm income has also been negative in some years of the 1980s, averaging a negative $800 million in constant dollars for the 1980–84 period. For 1985, earnings from equity recovered from the low

Table 2. Farm Sector Cash Flow

Item	Average for Period				Year		
	1970–71	1972–74	1975–79	1980–84	1985	1986[b]	1987[b]
	Billions of 1982 Dollars						
Gross Cash Income[a] (including net CCC loans)	128.9	165.7	157.8	152.2	139.8	131.3	127.2
Less Expenses Excluding Interest	75.1	87.4	94.5	90.1	78.2	75.7	72.1
Equals Cash Flow Before Interest Payments	53.8	78.3	63.3	62.2	61.6	55.6	55.2
Less Interest Paid	7.6	8.9	12.8	19.6	16.0	13.4	12.7
Equals Cash Flow After Interest Payments	46.1	69.3	50.7	42.4	45.6	42.2	42.5

[a]Excludes inventory adjustment, gross imputed rental value of farm dwellings, and home consumption.
[b]Forecast.

level of 1980–84 to near the level earned from 1975–79 but remained below the level earned during the 1970–71 preboom years.

From 1950 through 1971 both farm assets and income to assets increased at a steady pace, resulting in a rate of return of 2 to 3 percent. Between 1971 and 1973 the aggregate income to farm assets not only increased in both current and constant dollars but the growth in returns exceeded the growth in asset values, resulting in a rate of return to assets of more than 7 percent.

After peaking in 1973, income to assets decreased each year until 1977. Asset values continued to rise, yielding a rate of return to assets that fell not only below the level of the early 1970s but also below more traditional preboom levels. In 1985, aggregate returns to assets totaled $25 billion and, given the sector's substantially devalued asset base, the resulting 3.3 percent rate of return exceeded the 3.1 percent return earned on assets in the 1970–71 preboom period (Table 3).

Table 3. Returns to Farm Production Assets and Equity

Item	Average for Period				Year		
	1970–71	1972–74	1975–79	1980–84	1985	1986[a]	1987[a]
	Billions of 1982 Dollars						
Gross Farm Income (Excluding Operator Households)	132.7	170.3	162.4	152.3	139.9	131.4	127.3
Return to Operator	31.1	50.7	30.1	16.5	23.0	21.6	24.3
Return to Farm Assets and Operators' Labor and Management	43.4	67.5	48.9	42.6	45.7	40.9	42.3
Return to Farm Assets	19.6	41.6	22.8	18.9	25.0	20.2	21.8
Return to Equity	12.0	32.6	10.2	-0.8	8.9	6.7	9.1
Equity in Farm Assets (Market Basis) (End of Previous Year, Dec. 31)	522.5	583.5	720.8	807.2	588.5	505.9	441.1
Return to Percentage of Equity	2.3	5.6	1.5	-0.1	1.5	1.3	2.1
Total Farm Assets (End of Previous Year, Dec. 31)	637.6	705.8	867.6	994.1	766.4	673.7	597.9
Residual Income to Assets as Percentage of Asset Value (Percent)	3.1	5.9	2.7	2.0	3.3	3.0	3.7

[a]Forecast.

Figure 2. Farm Production Assets

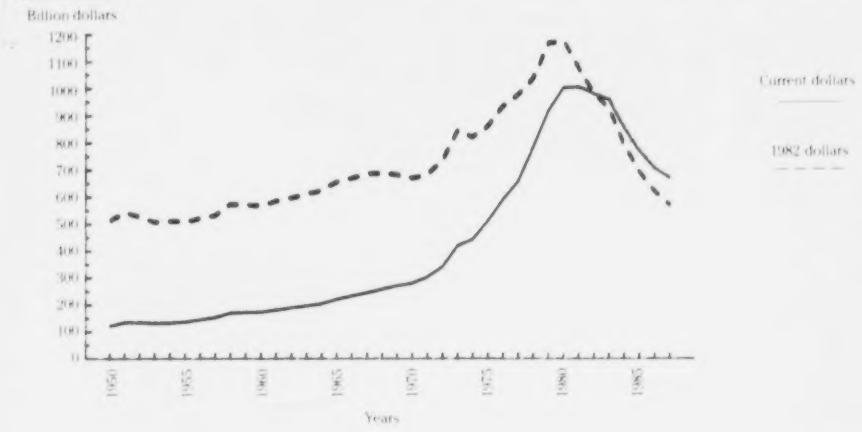
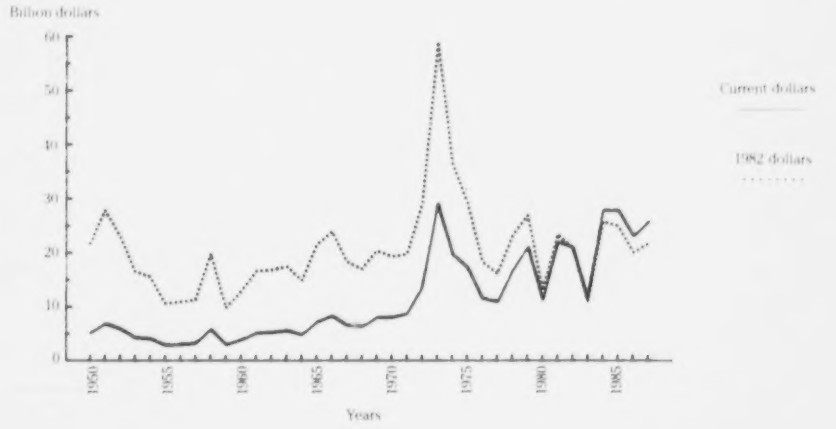


Figure 3. Return to Farm Production Assets



Relationships between farm debt and income flows to farm production assets are graphed in Figures 4 and 5. Farm assets and the return to assets are shown in Figures 2 and 3.

While the sector's rate of return to assets has improved recently, the ratios of farm debt to either annual income to assets or cash flow remain at relatively high levels. Through the 1960s and the early 1970s, debt outstanding generally equaled two to three times annual cash flow and five to seven times the annual income-to-production assets. The rapid increase in debt usage that occurred between 1973 and 1981 combined with relatively stable cash flows and fluctuating incomes to assets resulted in a multiple of debt to cash flow that rose steadily through the 1970s to over five in 1980–84 and a multiple of debt to returns that exceeded ten in three different years.

Reflecting the downturn in debt outstanding which began in 1982 and some improvement in cash flows and returns to assets, debt stood at 4.4 times cash flow and 6.7 times annual returns in 1985. Those relationships reinforce the observation that although cash flows and returns prior to debt service resemble those existing prior to the boom

Figure 4. Farm Debt Compared with Income Flows to Farm Production Assets

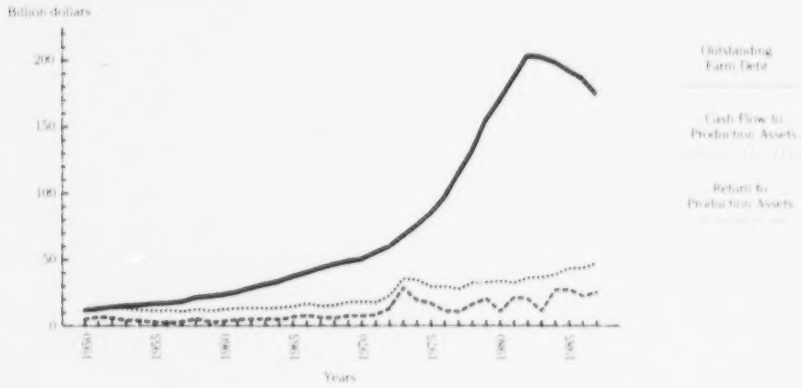
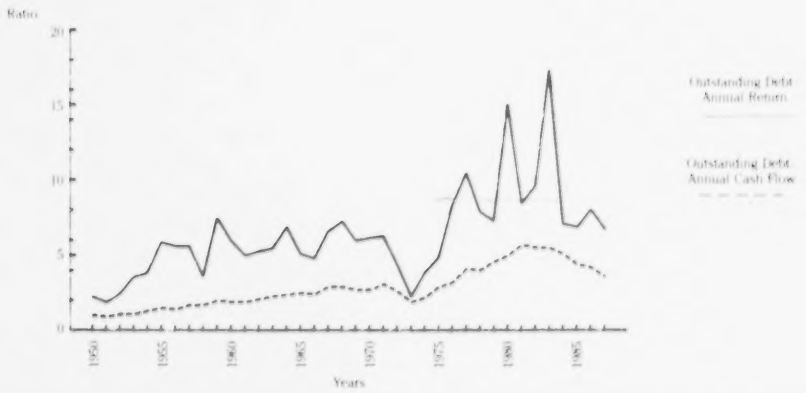


Figure 5. Farm Debt Compared with Income Flows to Farm Production Assets



years of the early 1970s, cash flows and returns after debt service remain at relatively low levels even in comparison to the preboom period of the early 1970s. The result has been that farmers with above average levels of debt have been unable, on average, to service their debt from current earnings.

As discussed above, cash income in 1986 is now expected to remain near the 1985 level, while net farm income is expected to drop about 6 percent. Both net cash and net farm income in 1987 are now expected to increase in both nominal and real terms, reflecting a continued reduction in production expenses and continued large government payment and loan outlays. Mirroring the change expected for net farm income, aggregate returns to operators, assets, and equity in 1986 will likely be below their 1985 levels before recovering in 1987 to near their 1985 levels.

Returns to farm assets in 1986 will be about equal the preboom 1970–71 average in constant dollars, and perhaps, in 1987 about 10 percent above the 1970–71 level. Returns to equity, reflecting the continued large

interest commitment of the sector, are projected to remain below their preboom levels in constant dollars. That forecast of relatively stagnant real income to assets or equity suggests that there is little likelihood of a turnaround in asset values in the near term. Moreover, available data indicate that land values have continued to decline through 1986, although perhaps at a slower pace than in the last two or three years. Econometric modeling efforts that view land values as a function of the returns generated from land, the prospects for long- and intermediate-term investments, and the real costs of financing also suggest that land values will be lower in 1986 and will likely continue to drop in 1987 although at a slower pace. Reflecting expected continued declines in real estate values, the value of total assets may decrease by about 8 percent in 1986. A decrease of about 5 percent may occur in 1987. Current data also indicate that liabilities are either continuing to be repaid or written off. Including Commodity Credit Corporation (CCC) loans, total liabilities may decrease by about 3 percent in 1986 (Table 4). Excluding CCC loans, debt may decline by about 6 percent. Since the drop in debt will likely be less than the drop in asset values, owner equity will continue to contract in 1986.

Aggregate financial data indicate that some farmers are in financial difficulty even though for the farm sector as a whole net incomes are positive and larger in real terms than those earned earlier in the 1980s, and real equity remains substantial. That raises several questions for which farm level data are needed: What proportion of farmers are experiencing financial difficulties? What share of operator debt does that group hold? To which lenders is the debt owed? And, what portion of the debt is likely at risk of loss?

Current Financial Position of Individual Farms

Data obtained from USDA's *Farm Costs and Returns Survey* (FCRS) permit a more detailed perspective of current financial difficulties experienced by U.S. farmers. The initial focus concerns distributional issues associated with the financial position of farm operators based on earnings and solvency classifications (J. Johnson, Prescott, Banker, and Morehart). We then incorporate two additional approaches to analysis that use alternative classifications of financial well-being that specifically address commercial farm operators. The first developed by Melichar (1986a), uses measures of return on assets and return on equity in conjunction with debt-to-asset ratios and equity levels to examine financial viability. The second approach (Hanson, J. Johnson, and Freshwater) provides an evaluation of financial stress on the ability of farms to service debt.

Farm Household Earnings and Solvency

Income statements and balance sheets constructed from FCRS data are the framework for analysis of farm operator

Table 4. Farm Sector Balance Sheet, Excluding Dwellings

Item	1985	1986[a]	Percent Change	1987[a]	Percent Change
	Billion Dollars		*Percent*	*Billion Dollars*	*Percent*
Assets					
Real Estate	559.6	509	-9	474	-7
Nonreal Estate[b]	211.9	197	-7	195	-1
Total	771.4	707	-8	669	-5
Liabilities					
Real Estate	97.3	92	-5	89	-3
Nonreal Estate	94.8	94	—	86	-9
CCC	16.9	22	30	17	-23
Total	192.1	186	-3	174	-6
Equity	579.3	520	-10	494	-5
D/A Ratio (Percent)	24.9	26.4	—	26.1	—

[a]Forecast.
[b]Includes financial assets.

Table 5. Percentage Distribution of Farms, Operator Debt, and Value of Production by Household Earnings and Debt-to-Asset Ratios

Earnings Status	No Debt		Low Debt[a]		High Debt[b]		Total	
Positive Earnings	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*
Farms	19	22	22	23	6	10	47	55
Debt	0	0	20	21	19	29	37	50
Value of Production	13	15	31	33	14	19	58	67
Negative Earnings								
Farms	22	18	18	16	13	11	53	45
Debt	0	0	18	13	43	37	63	50
Value of Production	6	5	17	12	19	16	42	33
All Farms								
Farms	41	40	40	39	19	21	100	100
Debt	0	0	38	34	62	66	100	100
Value of Production	19	20	48	45	33	35	100	100

[a]Low debt corresponds to debt-to-asset ratios of 40 percent or less.
[b]High debt is defined as debt-to-asset ratios of more than 40 percent.

financial positions. In this section cash flow is defined to emphasize the farm household. Specifically, farm household earnings were determined by subtracting farm business operating expenses and estimated debt repayment and family living expenses from total gross income from all sources.

It is important to note that the income statement and consequently earnings estimates developed from the FCRS differ from what is traditionally reported in *Economic Indicators of the Farm Sector: National Financial Summary* described in the first part of this paper. The FCRS cannot be used to compute either a net inventory change or an accurate measure of annual depreciation. Thus, we are unable to estimate net farm income of farm operators over the period. Furthermore, income estimates based on FCRS data pertain only to farms that qualified for the survey and hence exclude farms that sold or purchased less than $1,000 worth of agricultural products.

Information on assets and debt necessary for construction of farm operator balance sheets were taken directly from the survey. Assets include the farm operator's estimate of current market value of land and buildings, farm machinery and equipment, livestock and crops stored on or off the farm, purchased or unused inputs, and any other farm assets. Farm debt was reported as all ending calendar year liabilities related to the farm business. Again, due to conceptual differences and survey coverage, FCRS balance sheets differ from the sector balance sheet presented earlier.

Farm operators were classified in one of six earnings or solvency categories based on combinations of the following criteria: positive or negative cash flow; or no debt, low debt (debt-to-asset ratio less than or equal to 0.40), and high debt (debt-to-asset ratio greater than 0.40). Table 5 presents the percentage distribution of farms, debt, and value of production by earnings and solvency classifications for 1984 and 1985. Cash flow positions have improved since 1984 when 47 percent of farms had positive household earnings compared to the current figure of 55 percent. That improvement in earnings is due to the substantial increases in government payments and lower production expenses. A larger portion of farm operator households also reported nonfarm earnings that could be used to either support the farm family or assist with business operations.

Reflecting the continued erosion of asset values, farms in high leverage situations increased from 19 percent in 1984 to 21 percent in 1985. Those farms accounted for two-thirds of U.S. total operator debt reported in the survey and about one-third of U.S. total value of production in 1985.

Farms in the weakest financial position are those with high debt and negative earnings. Eleven percent of farms fell under that classification in 1985 compared to 13 percent in 1984. Another 10 percent of farms were highly leveraged but had sufficient income to

Table 6. Percentage Distribution of Farms by Household Earnings and Debt-to-Asset Ratios for Major Enterprise of Farm

Earnings Status	No Debt		Low Debt[a]		High Debt[b]		Total	
Positive Earnings	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*
Small Grain	20	21	27	28	8	11	55	60
Corn and Soybean	15	19	26	25	9	16	50	60
Specialty Crops	20	23	17	16	5	5	42	44
Cotton and Rice	15	15	20	30	8	16	43	61
Fruit, Vegetable, and Nursery	21	29	25	30	6	7	52	66
Beef	25	28	16	20	3	5	44	53
Milk	13	18	27	29	11	12	51	59
Hog	9	15	24	21	9	17	42	53
Poultry	20	30	34	29	13	15	67	74
Other	19	25	21	20	4	6	44	51
Negative Earnings								
Small Grain	12	8	19	19	14	13	45	40
Corn and Soybean	15	11	19	14	16	15	50	40
Specialty Crops	33	26	16	18	9	12	58	56
Cotton and Rice	9	8	24	15	24	16	57	39
Fruit, Vegetable, and Nursery	24	16	15	12	9	6	48	34
Beef	31	25	17	15	8	7	56	47
Milk	9	8	19	15	21	18	49	41
Hog	11	15	22	14	25	18	58	47
Poultry	14	9	6	11	13	6	33	26
Other	28	27	20	16	8	6	56	49

[a]Low debt corresponds to debt-to-asset ratios of 40 percent or less.
[b]High debt is defined as debt-to-asset ratios of more than 40 percent.

service debt. Those farms could face potential financial difficulties given unfavorable changes in earnings.

Total farm operator debt held by farms that had negative cash flows and were highly leveraged declined from 43 percent in 1984 to 37 percent in 1985. The proportion of total value of production attributed to farms in the worst financial position declined from its 1984 value of 19 percent to 16 percent in 1985. Forty percent of farms reported no debt as of January 1, 1986. Over one-half of those farms were able to generate positive earnings. Forty-five percent of farms had low or no debt and positive household earnings in 1985. Those farms accounted for 48 percent of value of production.

Evaluation of FCRS data for individual farms provides consistent results with the aggregate sector financial experience described above. The distribution of farms by earnings and solvency measures has shown moderate improvement since 1984. Furthermore, the majority of that improvement can be attributed to higher farm household earnings. The remainder of this section is devoted to financial positions of individual farms with respect to type of farm, regional location, and economic size.

Financial position of operators by major enterprise of farm. The incidence of financial stress among farm types is examined by comparing the distribution of farms within earnings or solvency categories. Farms were assigned a particular enterprise type based on the commodity that represented the largest proportion of total value of farm production (Table 6). Enterprises with the highest percentage of farms in the weakest financial position (negative cash flow and high debt levels) in 1985 were milk producers (18 percent), hog enterprises (18 percent), cotton and rice farms (16 percent), and producers of corn and soybeans (15 percent). Those farms also had the most unfavorable earnings or solvency distributions in 1984 but to a larger degree.

A closer examination of earnings positions and debt levels associated with troubled farm types identified above reveals the uniqueness of each financial situation (Table 7).

Table 7. Earnings and Debt-to-Asset Ratio Positions for Selected Farm Types

Enterprise	Negative Earnings		Debt-to-Asset Ratio Above .7		Negative Earnings and Debt-to-Asset Ratio Above .7	
	1984	*1985*	*1984*	*1985*	*1984*	*1985*
Milk						
Sales Above $40,000	44	37	12	13	9	9
Sales Below $40,000	77	59	7	12	6	8
Hog						
Sales Above $40,000	56	36	18	20	12	12
Sales Below $40,000	61	60	14	10	14	5
Cotton and Rice						
Sales Above $40,000	55	35	18	18	13	8
Sales Below $40,000	62	56	9	7	6	7
Corn and Soybean						
Sales Above $40,000	47	34	13	16	9	9
Sales Below $40,000	54	49	8	10	6	6

For example, hog producers with sales of more than $40,000 (representing about one-half of all hog enterprises) had improved earnings in 1985 although the proportion of highly leveraged farms increased. The opposite situation occurred from 1984 to 1985 for small hog producers. Their earnings positions were unchanged, and farms with debt-to-asset ratios of more than 70 percent fell from 14 to 10 percent. In contrast, improved earnings for both small and large size producers of corn and soybeans were accompanied by increases in the percent of farms with debt-to-asset ratios above 70 percent.

Financial position of operators by region. The regional distributions of farm operators by earnings and solvency are presented in Table 8. The Lake States, Northern Plains, Corn Belt, Mountain, and Delta regions had the highest proportion of farms with negative earnings and debt-to-asset ratios above .4. With the exception of the Lake States, farm household cash flow has improved in those regions since 1984. In the Lake States, Northern Plains, Southern Plains, and Mountain regions there were increases in the percentage of high-debt farms (debt-to-asset ratio above 0.40) indicating continued balance sheet problems.

Financial position of operators by value of production class. Farms were classified in six size categories based on the gross value of production. The distributions of operators by earnings and solvency positions within size categories for 1984 and 1985 are presented in Table 9. Seven percent of farms with value of production of $40,000 or less had negative earnings and debt-to-asset ratios above 40 percent in 1985 while the proportion of larger operators in the worst financial position ranged from 12 to 18 percent. The percent of farms with positive earnings was directly related to value of production. For example 51 percent of farms with value of production of $40,000 or less had positive earnings in 1985, however 74 percent of farms with more than $1 million in value of production had positive earnings the same year. Earnings positions have improved for all size classifications since 1984 resulting in a decrease in the percent of farms in the worst financial position. The percent of farms with debt-to-asset ratios above .4 increased from 1984 to 1985 in all but the largest value of production class. That result reflects balance sheet problems identified above. The more detailed investigation of commercial operators and the debt associated with those farms is provided in the remainder of this article.

Returns, Equity, and Solvency

The financial viability of commercial farm operators was evaluated by joint consideration of return on assets, return on equity, amount of equity, and debt-to-asset ratios. Commercial farm operators are defined as farms that had annual gross sales of $40,000 or more. Return on assets is measured here as net cash operating income

Table 8. Percentage Distribution of Farms by Household Earnings and Debt-to-Asset Ratios for U.S. Production Regions

Earnings Status	No Debt		Low Debt[a]		High Debt[b]		Total	
Positive Earnings	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*
Northeast	13	23	20	26	5	8	38	57
Lake States	16	17	29	21	6	13	51	51
Corn Belt	19	23	22	25	10	14	51	62
Northern Plains	16	18	23	27	8	15	47	60
Appalachia	24	30	19	16	4	3	47	49
Southeast	27	24	20	25	4	7	51	56
Delta	16	26	14	19	5	5	35	50
Southern Plains	21	21	21	28	4	7	46	56
Mountain	16	22	21	21	8	11	45	54
Pacific	22	27	25	26	6	9	53	62
Negative Earnings								
Northeast	29	23	24	14	9	6	62	43
Lake States	13	14	17	16	19	19	49	49
Corn Belt	17	13	17	13	15	12	49	38
Northern Plains	13	7	21	16	19	17	53	40
Appalachia	34	30	13	15	6	6	53	51
Southeast	23	24	17	13	9	7	49	44
Delta	33	24	19	14	13	12	65	50
Southern Plains	29	18	18	18	7	8	54	44
Mountain	13	14	28	19	14	13	55	46
Pacific	18	18	18	13	11	7	47	38

[a]Low debt corresponds to debt-to-asset ratios of 40 percent or less.
[b]High debt is defined as debt-to-asset ratios of more than 40 percent.

Table 9. Percentage Distribution of Farms by Household Earnings and Debt-to-Asset Ratios for Gross Value of Production Classes

Earnings Status	No Debt		Low Debt[a]		High Debt[b]		Total	
Positive Earnings	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*	*1984*	*1985*
More Than $1 Million	9	19	32	36	23	19	64	74
$500,000–$999,999	6	13	39	34	17	26	62	73
$250,000–$499,999	11	11	33	40	16	25	60	76
$100,000–$249,999	13	14	33	34	14	18	60	66
$40,000–$99,999	17	21	24	26	7	10	48	57
Less Than $40,000	22	28	17	17	4	6	43	51
Negative Earnings								
More Than $1 Million	3	3	12	10	21	13	36	26
$500,000–$999,999	4	1	15	14	19	12	38	27
$250,000–$499,999	2	1	17	8	21	15	40	24
$100,000–$249,999	3	3	16	13	21	18	40	34
$40,000–$99,999	8	6	25	20	19	17	52	43
Less Than $40,000	33	28	17	14	7	7	57	49

[a]Low debt corresponds to debt-to-asset ratios of 40 percent or less.
[b]High debt is defined as debt-to-asset ratios of more than 40 percent.

before interest as a percentage of owned assets. Return on equity is net cash operating income after interest payments as a percentage of equity. Equity is owned assets minus debt. Debt-to-asset ratio is debt as a percentage of owned assets.

Table 10 provides details of the returns, equity, and solvency classification scheme. Farm operators who had a favorable combination of returns and a demonstrated ability to sustain equity by earning high returns with relatively high debt or positive returns with little or no debt (equity cushion) were considered to be in "good" financial position. Farms categorized as being in "fair" financial position had inadequate returns to sustain current equity

Table 10. Criteria for Commercial Farms Classification

If Debt/Asset Ratio	And if Return on Assets	And if Return on Equity	Then Financial Position Is
Operators With Equity Under $50,000			
Under 40	Above 0	na	Good
40 to 70	Above 5	na	Good
Over 70	Above 15	na	Good
Under 40	-5 to 0	na	Fair
40 to 70	0 to 15	na	Fair
Over 70	5 to 15	na	Fair
Under 40	-15 to 5	na	Stressed
40 to 70	-5 to 0	na	Stressed
Over 70	0 to 5	na	Stressed
Under 40	Under -15	na	Vulnerable
40 to 70	Under -5	na	Vulnerable
Over 70	Under 0	na	Vulnerable
Operators With Equity Above $50,000			
Under 40	Above 0	Above 0	Good
40 to 70	Above 5	Above 5	Good
Over 70	Above 15	Above 15	Good
If Not Already Classified as Good, Then			
Under 10	Above -15	Above -15	Fair
10 to 40	Above -5	Above -5	Fair
40 to 70	Above 0	Above 0	Fair
Over 70	Above 5	Above 5	Fair
If Not Already Classified as Good or Fair, Then			
Under 10	na	na	Stressed
10 to 40	Above -15	Above -15	Stressed
40 to 70	Above -5	Above -5	Stressed
Over 70	Above 0	Above 0	Stressed
If Not Already Classified as Good, Fair, or Stressed, Then			Vulnerable

na = not applied
Source: Melichar 1986a

or to service fully their debt over the longer term. Intermediate-term financial difficulties are likely for farms classified as "stressed" unless returns improve or their debt service burden diminishes. Farms currently in the most serious financial trouble due to inadequate returns and equity cushion were classified as "vulnerable."

The results presented in Table 11 suggest a small improvement in the financial situation since 1984 for the majority of commercial farm operators. The percent of farms classified as being in a "good" financial position increased from 70 to 74 percent. The share of assets held by those farms increased slightly from 65 to 66 percent while the proportion of commercial farm debt held by those farms went from 51 percent in 1984 to 57 percent in 1985. Total assets and debts refer to those reported in the FCRS.

Moderate improvement occurred at the other extreme of financial position as well. Commercial farm operators classified as vulnerable decreased from 10 percent in 1984 to 9 percent in 1985. The proportions of FCRS assets and debt held by "vulnerable" operators declined by 2 and 5 percent respectively since 1984.

The results also reveal that under that classification scheme high debt-to-asset ratios do not automatically imply a "vulnerable" financial position. A small percentage of highly leveraged commercial farms generated sufficient returns to service debt. Conversely, there were operators with low debt relative to assets who, due to poor returns, were classified as being in a "vulnerable" financial position.

Regional, type of farm, and sensitivity extensions. The regional distribution of farms by returns, equity, and solvency classifications is portrayed in Figure 6. The Southern Plains and Delta regions had the most unfavorable distributions in 1985 with more than 20 percent of commercial operators classified as either "stressed" or "vulnerable." Commercial farms located in the Northeast, Corn Belt, and Pacific regions were in the strongest financial position compared to other regions.

Results of applying returns, equity, and solvency classifications across enterprise types based on the largest share of total value of production are presented in Figure 7. Nearly 80 percent of fruit, vegetable, and nursery enterprises and milk producers were classified as being in "good" financial position in 1985—the most among enterprise types. Commercial farm types experiencing greater financial difficulties were producers of cotton and rice, beef enterprises, and other farm types with each having 19 percent of farms classified as being in a "stressed" or "vulnerable" financial position.

The final extensions of this analysis involve examining the sensitivity of the distribution of farms to changes in the level of income

Table 11. Distribution of Commercial Farm Operators, Assets, and Debts by Relative Debt and Financial Position

Financial Position	Debt-to-Asset Ratio (Percent)								Percentage of Total	
	Under 10		11 to 40		41 to 70		Over 70			
	Percentage Distribution of Operators								*Operators*	
	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985
Good	29	29	26	25	11	13	5	7	70	74
Fair	5	5	4	3	2	1	2	3	13	13
Stressed	1	*	3	2	2	1	1	1	7	5
Vulnerable	*	1	2	1	5	3	4	3	10	9
	Percentage Distribution of Assets								*Assets*	
	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985
Good	29	29	26	24	8	10	2	4	65	66
Fair	9	12	5	5	2	2	2	3	18	21
Stressed	1	1	4	3	2	1	1	1	7	5
Vulnerable	*	*	2	1	5	4	3	2	10	8
	Percentage Distribution of Debt								*Debt*	
	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985
Good	2	2	23	20	16	20	9	14	51	57
Fair	1	1	5	4	4	3	6	10	16	18
Stressed	*	*	4	3	4	3	3	2	10	8
Vulnerable	*	*	2	1	11	8	11	9	23	18

* Less than 0.5 percent.

Figure 6. Distribution of Commercial Farms by Region and Financial Condition, 1985

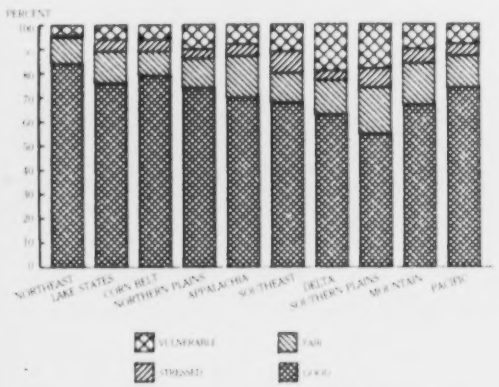
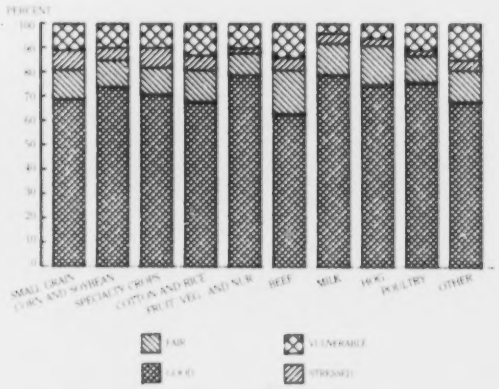


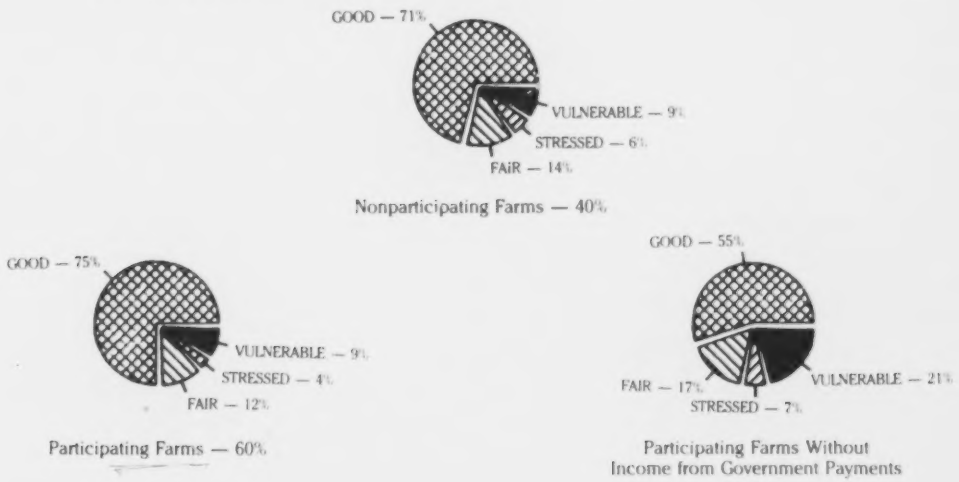
Figure 7. Distribution of Commercial Farms by Major Enterprise and Financial Condition, 1985



received from government payments and to changes in the value of farm assets. Government payments were identified as a key item regarding improvements in the cash flow position of the sector. Similarly, declining asset values have been a key factor for the majority of balance sheet difficulties in recent years.

The most extreme situation—total removal of income from government payments while other 1985 values remained the same—is depicted in Figure 8. Sixty percent of commercial farms in the 1985 FCRS reported receiving either direct government payments or had CCC loans. The distribution of farms was almost identical between participating and nonparticipating farms under current conditions. The contribution of government programs to returns is evidenced by viewing the classification of farm operators following the removal of income from government

Figure 8. Distribution of Commerical Farms by Receipt of Government Payments and Financial Condition, 1985[a]



[a]Government payments include direct payments and net CCC loans.

payments. Subtracting income from government programs caused participating commercial farms classified in "good" financial position to decrease to 55 percent from the current level of 75 percent. The percentage of participating farms classified as "vulnerable" more than doubled when income from government programs was removed. Further analyses of the potential changes in the current distribution of farms under returns, equity, and solvency criteria to more realistic changes in the level of income from government programs are presented in Table 12 which combines participating and nonparticipating farms.

The proportion of commercial farms classified as being in good financial position appears to be less sensitive to changes in the value of assets (ceteris parabis) than the proportion of farms categorized as "stressed" or "vulnerable" (Figure 9). With a 20 percent reduction in the value of assets, the percent of farms classified as "vulnerable" increased from its 1985 value of 8.5 percent to 9.6 percent. Conversely, the percentage of farms classified as "vulnerable" declined from 8.5 percent to 7.7 percent when the value of assets was increased by 20 percent.

Debt Service and Solvency

The debt-to-asset ratio and the debt service ratio were used to analyze commercial farms-at-risk and debt-at-risk. The debt-to-asset ratio refers to debt as a percentage of assets where the value of assets is based on market prices.

The debt service ratio shows income available to pay principal and interest expenses. It is the sum of net cash income before interest (including off-farm income) less machinery investment and estimated household withdrawals divided by the sum of principal and interest expenses. Debt service was classified as full, partial, or none based on estimated values of the debt service ratio. A debt service ratio of one or more implied full debt service. Partial debt service occurred if the value of the ratio was between zero and one. A value of less than zero for the debt service ratio indicated no debt service ability.

Table 13 presents the basic matrix of debt service classifications by debt-to-asset ratio used to identify commercial farms with debt-at-risk in 1985. More than 15 percent of all commercial farms had an unfavorable combination of debt-to-asset ratio and debt service ratio. Those farms held almost 35 percent of total commercial farm debt reported in the 1985 FCRS. One-half of the estimated debt-at-risk was held by the 6.6 percent of commercial farm operators identified as technically insolvent (debt-to-

Table 12. Sensitivity of the Distribution of Commercial Farm Operators, Their Assets and Debt, by Financial Position to Changes in the Level of Income from Government Payments, 1985

Government Payments[a]	Operators	Assets	Debt
	Financial Position Good		
1985	73.6	66.4	57.0
10% Reduction	72.6	65.5	55.3
20% Reduction	71.7	64.9	54.1
50% Reduction	68.0	61.3	47.9
No Payments	61.5	55.9	40.5
	Financial Position Fair		
1985	13.0	20.5	17.7
10% Reduction	13.5	21.0	18.2
20% Reduction	13.7	21.0	18.4
50% Reduction	14.7	22.5	19.9
No Payments	15.6	23.0	17.9
	Financial Position Stressed		
1985	4.8	5.2	7.5
10% Reduction	5.0	5.3	7.9
20% Reduction	5.4	5.4	7.9
50% Reduction	6.1	6.2	9.3
No Payments	6.7	7.1	10.8
	Financial Position Vulnerable		
1985	8.5	7.9	17.7
10% Reduction	8.9	8.3	18.6
20% Reduction	9.2	8.7	19.7
50% Reduction	11.1	10.0	22.9
No Payments	16.2	14.0	30.8

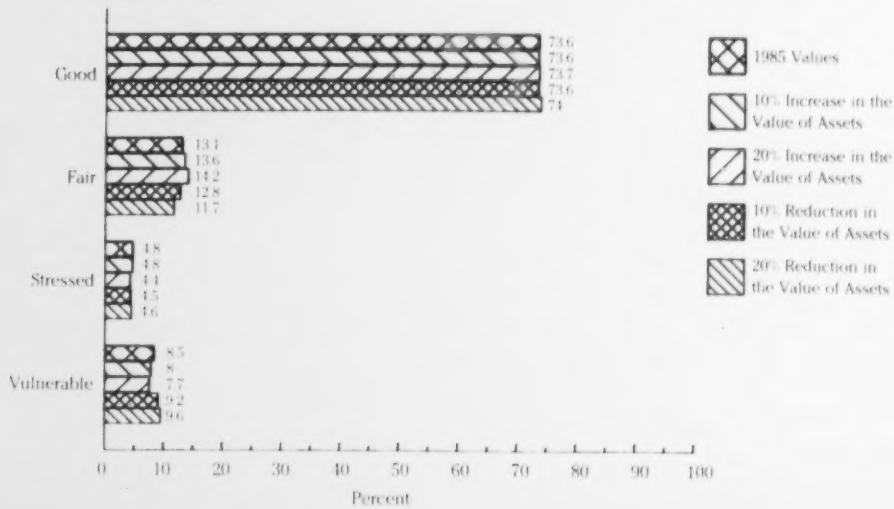
[a]Includes direct payments and net CCC loans.

Table 13. Distribution of Commercial Farms and Debt by Debt-to-Asset Ratio and Debt Service Ratio Classification, 1985

Item	Debt-to-Asset Ratio			Total at Risk
	.4–.7	.71–1	More Than 1	
	Percent			
Full Debt Service				
Farms	NA	NA	1.8	1.8
Debt	NA	NA	4.5	4.5
Partial Debt Service				
Farms	NA	2.8	2.5	5.3
Debt	NA	8.2	7.8	16.0
No Debt Service				
Farms	4.1	1.7	2.3	8.2
Debt	6.2	2.8	5.0	14.0
Total at Risk				
Farms	4.1	4.5	6.6	15.3
Debt	6.2	11.0	17.4	34.6

NA = Not applicable because debt held by these categories is not considered at risk.

Figure 9. Sensitivity of the Classification of Commercial Farms to Changes in the Value of Assets



asset ratio above 1.0) as of January 1, 1986. The remaining commercial farm operations identified as being at risk had more reasonable debt-to-asset ratios yet were unable to generate sufficient returns to service current debt.

Figure 10 presents the distribution of commercial farms-at-risk by enterprise type based on the commodity representing the largest share of total value of production. Producers of cotton and rice and hog enterprises had the highest percentage of farms-at-risk. Differences in the financial situation of those enterprises are revealed by examining the distribution of farms-at-risk across debt service position. The majority of cotton and rice farms-at-risk had no debt service capabilities reflecting the absence of sufficient returns to service current debt levels. On the other hand, a large portion of hog enterprises-at-risk had partial debt service capabilities indicating a relatively less severe performance problem.

The distribution of commercial farm debt-at-risk by enterprise was consistent with the distribution of farms (Figure 11). That is, hog enterprises and producers of cotton and rice had the largest proportion of total debt at risk in 1985. Although the percent of farms-at-risk was relatively low, nearly 20 percent of total commercial farm debt for specialty crops, beef, poultry, and other enterprise types was categorized under no debt service.

The distribution of commercial farms-at-risk by production region in 1985 is presented in Figure 12. The Lake States, Northern Plains, Delta, and Southern Plains regions had the largest proportion of farms-at-risk. Among those regions, the financial situation appears to be more severe for commercial farms located in the Delta and Southern Plains regions because of the large percentage of operations with no debt service capabilities compared to the Lake States and Northern Plains. Given the association of cotton and rice production with the Delta and Southern Plains regions, type of farm and regional results are consistent with respect to the nature of the financial situation for farms identified as being at risk.

More than 40 percent of commercial farm debt in the Northern Plains, Southeast, and Delta regions was estimated to be at risk in 1985 (Figure 13). The proportion of debt-at-risk held by farms with no debt service ability exceeded 20 percent in the Southeast, Delta, and Southern Plains regions.

A Comparison of Approaches

Three alternative approaches to financial analysis that combine income statement and balance sheet components from the FCRS have been presented. They provide a similar view of the extent of financial difficulties currently experienced by commercial agriculture. Regardless of approach, about one-sixth of commercial farms were financially stressed in 1985 (Table 14). Those operators held approximately one-third of commercial farm debt reported in the FCRS.

Figure 10. Distribution of Commercial Farms-at-Risk by Major Enterprise, 1985

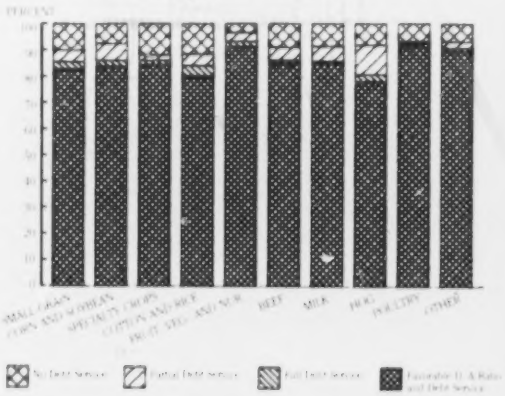


Figure 11. Distribution of Commercial Farm Debt-at-Risk by Major Enterprise, 1985

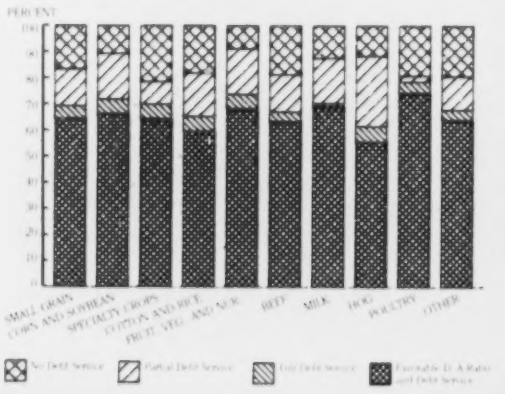


Figure 12. Distribution of Commercial Farms-at-Risk by Region, 1985

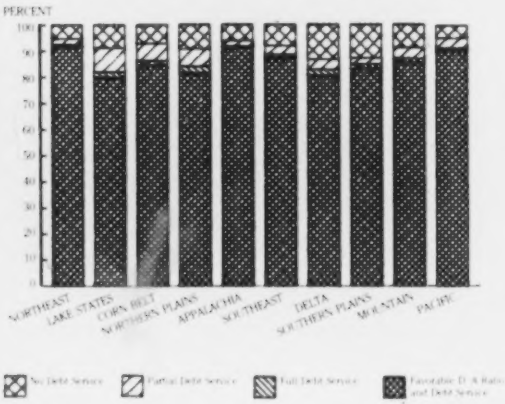


Figure 13. Distribution of Commercial Farm Debt-at-Risk by Region, 1985

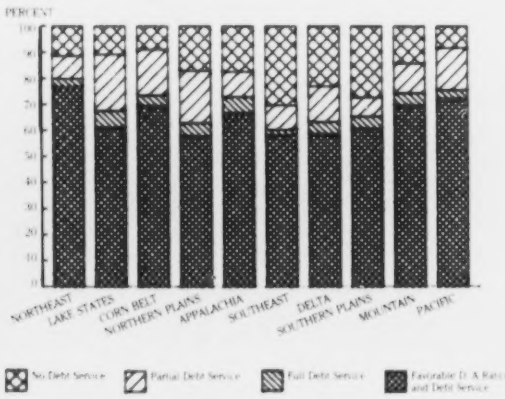


Table 14. Commercial Farms and Debt Identified as Financially Stressed by Alternative Measures, 1985

Approach	Percent of Commercial Farms	Percent of Commercial Farm Debt
Household Earnings and Solvency[a]	17	38
Returns, Equity and Solvency[b]	14	26
Debt Service and Solvency[c]	15	35

[a]Financially stressed defined as having negative household earnings and debt-to-asset ratio of more than 40 percent. [b]Financially stressed refers to "stressed" and "vulnerable" classifications. [c]Financially stressed defined as unfavorable combination of debt service and debt-to-asset ratios.

The alternative approaches also provide a similar assessment of the financial situation of commercial farm operators for specific farm types and regions. Producers of specialty crops, cotton and rice, and beef were identified as having the most pronounced financial difficulties compared to other farm enterprises. Across regions, the Northern Plains, Southeast, Delta, and Southern Plains had the largest proportion of commercial farms in the weakest financial position. To a large degree, similarities among approaches in the portrayal of current financial conditions occur because within regions and among farm types there are segments of producers that have extreme cash flow or balance sheet problems. At the margin, differences do exist among approaches as to the magnitude of farms experiencing less severe performance problems. Those farms are susceptible to short-term fluctuations in earnings and, depending on direction of change, their situation may either deteriorate or improve in the near future.

Distribution of Financially Stressed Debt by Lender

Having assessed the extent and diversity of financial difficulties experienced by U.S. farm operators, this section examines the vulnerability of debt and lenders associated with financially troubled farms. In particular, the focus is on commercial farm debt held by operators identified as financially stressed using the alternative approaches presented in the previous section.

In 1985, commercial banks, Federal Land Banks (FLB), and the Farmers Home Administration (FmHA) held major shares of total debt reported in the FCRS at 28, 22, and 15 percent respectively (Figure 14). Individuals held 12 percent of total debt, while the Commodity Credit Corporation (CCC), Production Credit Association (PCA), and other lenders each accounted for about 8 percent of total operator debt.

The proportion of commercial farm debt held by operators experiencing financial difficulties in 1985 ranged from 26 percent using returns, equity, and solvency criteria to 38 percent under household earnings and solvency classifications. A comparison of the distribution of that debt across lenders is

Figure 14. Distribution of FCRS Operator Debt by Lender, 1985

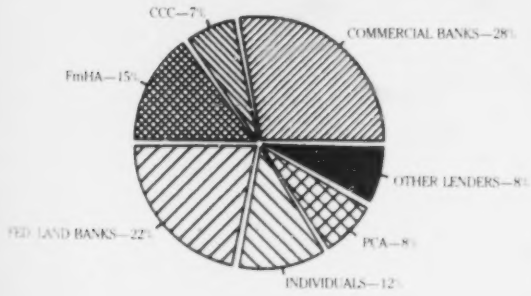
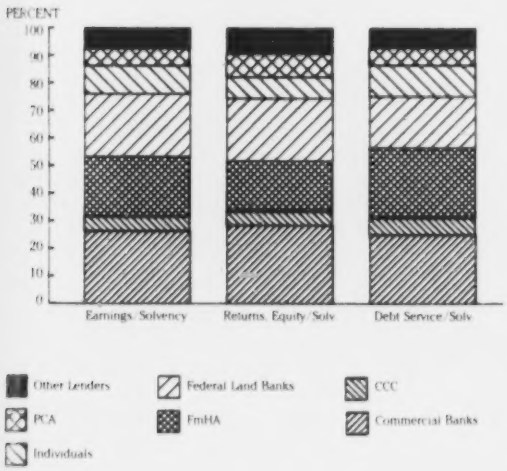


Figure 15. Distribution of Vulnerable Debt by Alternative Approach and Lender, 1985



presented in Figure 15. The distribution of vulnerable debt under each criteria closely resembles the distribution of total operator debt by lender. Thus, commercial banks, the FmHA, and FLBs were responsible for the majority (70 percent) of debt held by stressed commercial farms.

Commercial farm debt, identified as financially stressed by alternative approaches to financial analysis, is presented in Table 15 as a percentage of total FCRS operator debt held by various lenders. Compared with all other lenders, the FmHA loan portfolio was considerably weaker particularly under the household earnings and solvency and debt service and solvency classification schemes. That result was expected since typically the FmHA is the farm sector's lender of last resort. The proportion of the FmHA portfolio identified as vulnerable using the returns, equity, and solvency criteria was not drastically different from the situation for commercial banks, the PCA, or other lenders.

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Table 15. Debt Held by Financially Stressed Farms as a Percentage of Total FCRS Operator Debt, by Lender, 1985

Lender	Alternative Analytical Approaches		
	Household Earnings and Solvency[a]	Returns, Equity and Solvency[b]	Debt Service and Solvency[c]
Commercial Banks	31.1	22.2	26.3
Commodity Credit Corp.	23.0	15.0	24.6
Farmers Home Admin.	46.5	25.7	48.4
Federal Land Banks	33.0	21.8	24.1
Individuals	26.5	13.5	26.5
Prod. Credit Assoc.	25.7	23.2	23.2
Other Lenders	30.9	25.6	26.0

[a]Financially stressed defined as having negative household earnings and debt-to-asset ratio of more than 40 percent. [b]Financially stressed refers to "stressed" and "vulnerable" classifications. [c]Financially stressed defined as unfavorable combination of debt service and debt-to-asset ratios.

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Financial Condition of the Farm Credit System

C. Edward Harshbarger and Ralph M. Chite

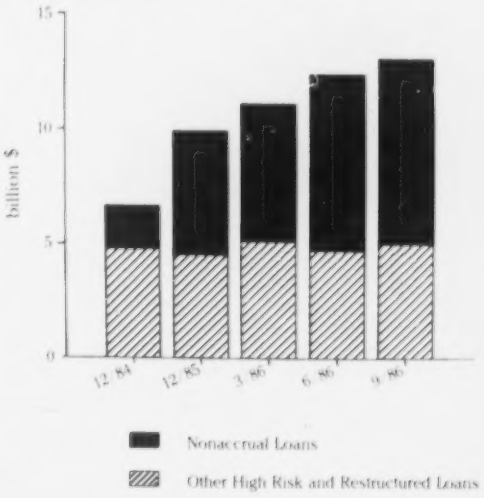
Continued financial stress in the farm sector over several years has caused weakness in many dimensions of the financial performance of the Farm Credit System (System). As a single-industry lender, the FCS has been severely affected by declining land values, depressed agricultural prices, dwindling export markets, and other economic events that have impaired the repayment capacity of agricultural borrowers.

Thus, a growing proportion of the System's loans are not performing according to their original terms and are requiring increased loan servicing actions. System institutions have also been making large provisions for loan losses on a portion of loans that farmers could not repay. While problem loan volume has increased, the volume of new System lending has been shrinking, as the banks and associations try to deal with the stresses of managing an increasing share of troubled debt. The combination of declining loan volume and growing levels of loan losses has contributed to unprecedented large operating losses and a rapid erosion of the System's capital base. To forestall the need for federal financial assistance, Congress has provided new authorities that allow the System and the Farm Credit Administration to deal more effectively with financial stress.

Financial Performance

The net loan portfolio of the System on September 30, 1986, was $58.2 billion, compared to its peak volume of $81.4 billion as of December 1983. Nearly $13.0 billion of the System's loans were in nonperforming status on September 30, and of those loans, $8 billion were so severely delinquent (six months or more) that the System stopped accruing interest, classifying the loans as nonaccrual. That represents a considerable deterioration since December 1984 when nonperforming loans were $6.7 billion and nonaccruals were $1.8 billion (Figure 1).

Figure 1. FCS Nonperforming Loans



Because of the rapid decline in credit quality, the System has made significant additions to its provisions for loan losses over the last two years. For the first nine months of 1986, provisions of $1.4 billion were made in anticipation of future loan losses—$1.2 billion by the Federal Land Banks (FLBs) alone—and in all of 1985 nearly $3 billion was added to provisions, with the FLBs accounting for the lion's share ($2.1 billion) of that amount.

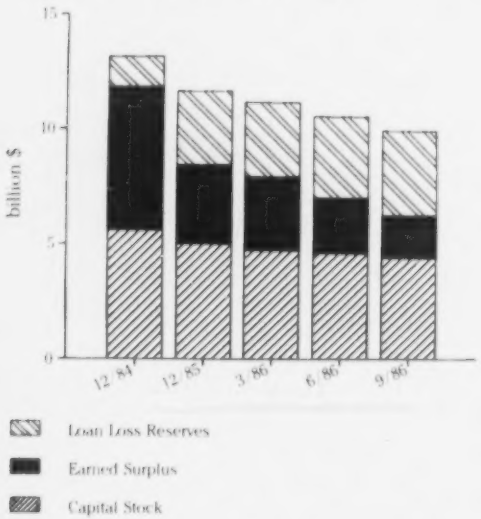
Any addition to provisions for loan losses is a direct reduction from System earnings. Consequently, in 1985 the System reported a net operating loss of $2.7 billion, its first annual loss since the Depression. Furthermore, a combined loss of $1.5 billion

C. Edward Harshbarger is chief of the Economic Analysis Division of the Farm Credit Administration, and Ralph M. Chite is a financial economist at the Farm Credit Administration.

has been posted for the first nine months of 1986. Of 1985's $2.7 billion net operating loss, the FLBs and their associations accounted for $2.2 billion of the total, as rapidly declining land values deteriorated the equity position and collateral of farmer-borrowers. Although the System as a whole has generated sufficient interest income to cover its interest expenses, the margin is rapidly consumed by the need for added provisions for loan losses.

Historically high operating losses have resulted in significant declines in the combined net worth of System institutions (Figure 2). On September 30, 1986, the System had $6.3 billion in equity, of which

Figure 2. FCS Total Risk Funds



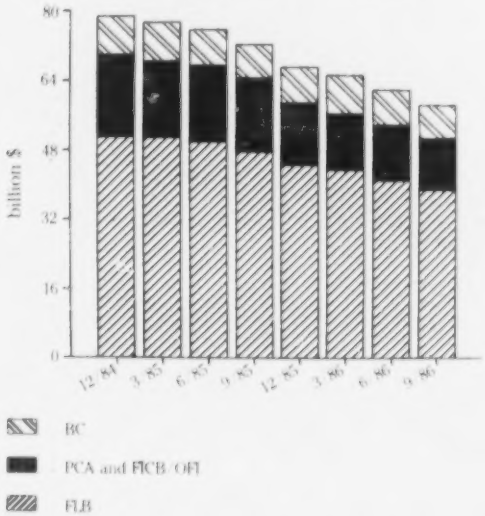
$4.4 billion was capital stock and $1.85 billion was earned surplus. Another $3.6 billion in the allowance for loan losses raises the System's total risk funds to $9.9 billion, down from $13.2 billion just twenty-one months earlier (Table 1).

Table 1. Farm Credit System Total Risk Funds

	9/86	12/85	12/84
	Billions of Dollars		
Capital Stock	$4.4	$ 5.0	$ 5.6
+ Earned Surplus	$1.9	$ 3.4	$6.2
+ Allowance for Loan Losses	$3.6	$ 3.2	$ 1.3
= Total Risk Funds	$9.9	$11.6	$13.2

Although the total volume of the System loan portfolio has shrunk considerably over the last few years, (Figure 3) loan charge offs explain only a small portion of the downsizing of the portfolio. Loan charge offs

Figure 3. FCS Net Loans Outstanding



were $975 million in the first three quarters of 1986, $1.2 billion in all of 1985, and $478 million in 1984. The Federal Intermediate Credit Banks-Production Credit Associations recognized their problem loans first and were responsible for a majority of the charge offs in 1984, whereas the FLBs accounted for a large part of the 1985 and 1986 charge offs. Considering that the System's loan portfolio contracted by $23.2 billion between December 1983 and September 1986, charge offs accounted for just 11 percent of the reduction.

In addition to loan charge offs, other reasons for the steep decline in System volume are: farmers, in general, have chosen to operate with less debt to improve their financial condition; commercial banks have become more interest rate competitive over the last several months, causing some borrower flight from the System to commercial banks; a doubling in Commodity Credit Corporation (CCC) loans outstanding diminished the need for new operating credit; the weakened financial position of the System alarmed some member-borrowers, causing them to pay off their loans and liquidate their holdings of System capital stock.

Legislative Initiatives

Congress passed legislation in each of the last two years to permit the System to deal more effectively with its problems and to reinstill investor and borrower confidence in the System. The Farm Credit Amendments Act of 1985 contained special provisions for both the System and the Farm Credit Administration (FCA). First, it gave the FCA enhanced enforcement authority by providing it with the necessary tools to ensure safe and sound banking practices of System institutions. Those tools are similar to the powers already given to the Comptroller of the Currency and other regulators of financial institutions and include the issuing of cease-and-desist orders, levying civil money penalties, and removing officers and directors.

Second, it created the Farm Credit System Capital Corporation and gave it the authority to assess the stronger institutions of the System for financial assistance to the weaker ones. Where financial assistance is provided, the Capital Corporation is expected to require improved management policies and practices in the recipient institutions. The Capital Corporation also has the power to purchase the nonperforming assets and acquired properties of financially troubled institutions and to serve as a workout bank for those assets.

Third, the new law established a mechanism by which the System may request federal financial assistance should it be needed, provided the System has effectively used its own resources to address its problems.

Before assistance is forthcoming, however, the secretary of the Treasury must endorse the certification of need issued by the chairman of the FCA board, and Congress must appropriate the funds.

Very importantly, the Farm Credit Amendments Act of 1985 was crucial in restoring investor confidence in the debt securities issued by the System. Just prior to the passage of the amendments, the spread on System issues over comparable Treasury issues had widened to 80–110 basis points from 10–30 basis points in early 1985. After passage of the amendments, the spread narrowed quickly to 50 basis points on the shorter maturities and eventually leveled off to 30 basis points in the first half of 1986.

The decline in market interest rates during most of 1986 produced strong pressure on System institutions to lower their lending rates both for competitive reasons and to benefit borrowers under financial stress. Although market rates declined dramatically on new debt issues in 1986, the average cost of the System's debt portfolio remains high because of the presence of high-priced, long-term bonds. With mortgage rates averaging around 10 percent at commercial banks at the end of 1986, it is difficult for the FLBs to compete when their average cost of debt is 10.25 percent. Moreover, heavy loan losses require higher than market rates to generate the income to make the necessary provisions for loan losses. While System institutions must remain sensitive to the need for maintaining earnings, they are permitted to selectively lower rates and are encouraged to establish a tiered rate structure in order to remain competitive.

The pressure to lower System interest rates, the steep decline in the System's earned net worth, an increase in bond spreads, and the desire to avoid or delay the need for federal assistance all precipitated the rapid enactment of additional legislation in October 1986. The Farm Credit Act Amendments of 1986 made possible a number of changes that Congress believes will provide the System more flexibility with interest rates and capital.

First, it repeals provisions of existing law that require the FCA to approve lending rates. Under the new law, setting interest rates becomes the prerogative of the boards of directors of the System banks. The law states, however, that no borrower be charged an interest rate below rates charged by other private lenders to borrowers of equal credit worthiness and access to credit. In establishing interest rates, the boards of directors are required to consider the effect their rate structures will have on the safety and soundness of the institutions. The key factor in safety and soundness is capital adequacy, an area FCA continues to regulate under provisions of the 1985 amendments.

The legislation also permits each bank, under conditions set by the FCA, to amortize

its cost of servicing high-priced debt over a period of up to twenty years. On the asset side of the balance sheet, the legislation allows System institutions with FCA approval to amortize loan losses that are in excess of one-half of 1 percent of loans outstanding, also over a twenty-year period. Both mechanisms are in effect from July 1, 1986, to December 31, 1988. To ensure accurate and adequate monitoring of the System's financial position, the FCA requires the institutions to maintain those regulatory accounting practices (RAP) as separate accounts, along with financial reports that reflect generally accepted accounting principles (GAAP).

The accounting provisions of the new law will significantly alter the financial reports of the System. Under the new rules for example the System's losses would have been only $100 million in 1985 instead of the reported loss of $2.7 billion. Because less money is required for loan loss reserves, the earned surplus is now larger and will not be exhausted as quickly. Therefore, the impairment of capital stock is forestalled. In effect, the System is buying more time before financial assistance is required. The impact is paid for by a charge against future earnings.

The legislation providing for RAP is nothing more than a stopgap, that, in the long run, could have serious consequences for the financial health of the System. The System will be faced with the burden of trying to recoup current losses for as long as the next twenty years. The System's lending rates will have to reflect those added costs, which will cause competitive pressures from other lenders.

"Creative accounting" measures are certainly not a permanent solution to the System's problems. Nonperforming assets will continue to drain the System's financial resources at a prodigious rate in the period ahead, and amortization schedules will not postpone the day of reckoning. Meanwhile, the System must continue to do everything in its power to conserve and use its resources effectively, focusing on opportunities to restructure loans so that they return to performing status, charging rates to borrowers that are competitive and yet consistent with maintaining a sound institution, and developing organizational structures that will enable the System to execute its public mission for the rest of this century. Although significant changes are in order, the System's basic objective of delivering sound and constructive credit and other services to rural America will remain unchanged.

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Financial Condition of Agricultural Banks

Emanuel Melichar

Farm Loan Problems at Commercial Banks

In the preceding paper, analyses of data reported by farm operators indicate that roughly one-fourth of debt owed to commercial banks was owed by operators who appeared to be experiencing financial difficulty. Thus it is not surprising that the amount of delinquent farm loans at banks has been rising and that banks have been charging off more farm loans. However, only about 10 percent of farm production loans at banks are past due as much as thirty days; therefore, many of the bank borrowers classified as financially stressed by the preceding analyses apparently have remained current on their bank loans.

Farm Loan Delinquencies

Delinquency rates on farm production loans at banks have been trending upward, as shown in Figure 1. (Banks do not report delinquencies and charge offs of loans secured by farm real estate, which constitute one-fourth of total farm loans at banks.) On June 30, 1986, past due and nonperforming farm production loans constituted 10.5 percent of such loans outstanding at all commercial banks, up from 8.6 percent a year earlier. Nonaccrual farm production loans reached 6.9 percent of outstandings, up from 5.2 percent. Table 1 shows trends and

Table 1. Estimated Delinquent Farm Production Loans, Insured Commercial Banks, June 30

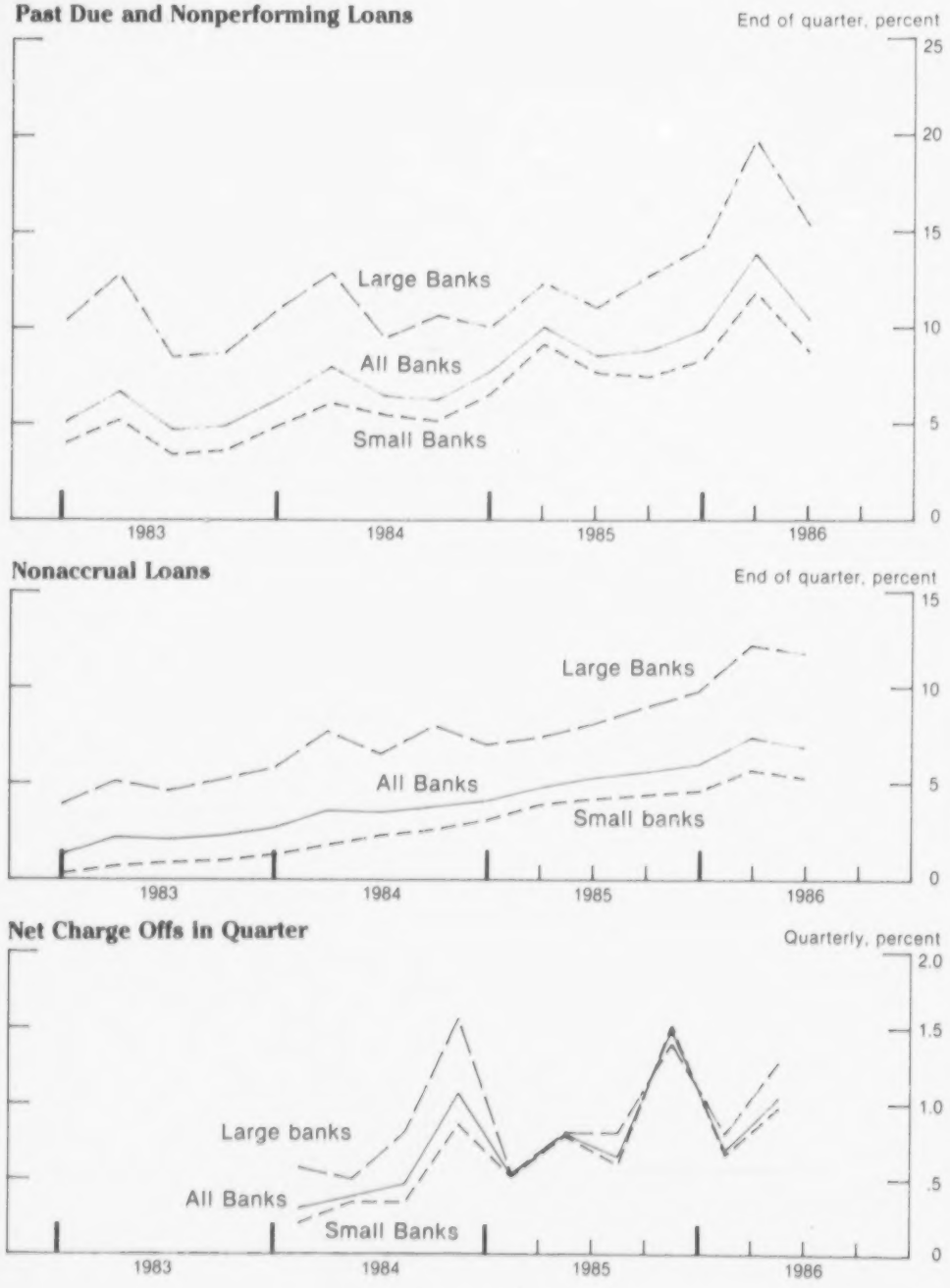
Class of Delinquent Loans	1983	1984	1985	1986
	Billions of dollars			
Total	1.9	2.6	3.4	3.6
Past Due 30 to 89 Days and Still Accruing	.5	.6	.7	.6
Nonperforming	1.4	2.0	2.7	3.0
Past Due 90 Days or More and Still Accruing	.5	.6	.7	.6
Nonaccrual	.8	1.4	2.1	2.4
	As Percentage of Outstanding Farm Production Loans			
Total	4.7	6.5	8.6	10.5
Past Due 30 to 89 Days and Still Accruing	1.3	1.5	1.7	1.7
Nonperforming	3.4	5.0	6.9	8.8
Past Due 90 Days or More and Still Accruing	1.3	1.5	1.7	1.9
Nonaccrual	2.1	3.5	5.2	6.9
Addendum Nonaccrual Loans at				
Large Banks[a]	4.6	6.5	8.1	11.8
Other Banks	.9	2.3	4.2	5.3

[a]Large banks have total assets of $300 million or more.

Data are estimates of national totals for farm nonreal estate loans. After 1984, estimates are based on reports from banks that hold about 92 percent of such loans. Earlier, only large banks that held about one-fourth of such loans reported nonaccrual farm loans; for other banks, estimates of nonaccrual farm loans are based on study of nonaccrual total loans at those banks.

Emanuel Melichar is senior economist, Economic Activity Section, Division of Research and Statistics, Board of Governors of the Federal Reserve System.

Figure 1. Delinquency and Charge Off Rates on Farm Production Loans, Insured Commercial Banks



levels of those and other categories of delinquent farm loans reported by banks.

Much of the upward trend in total delinquent farm production loans has consisted of a growing number of loans in nonaccrual status, that is, in general, loans on which payment in full of principal and interest is not expected. The amount in nonaccrual status rose by only $0.3 billion during the year ended June 30, 1986, compared with an increase of $0.7 billion during the preceding twelve-month period. But those increases in seriously delinquent loans occurred even though banks charged off over $2 billion in farm production loans over those two years.

Farm Loan Losses

Net charge offs of farm loans have trended upward since banks were first required to report such charge offs in 1984 (bottom panel of Figure 1). In that year, net charge offs totaled $0.9 billion, or 2.2 percent of farm production loans outstanding at year-end. In 1985, net charge offs rose to $1.3 billion, or 3.7 percent of year-end loans. In the first half of 1985, farm loan charge offs were nearly twice those of a year earlier, but their rate of increase then slowed markedly. In the first half of 1986, net charge offs of $590 million were up only modestly from $520 million in the corresponding period of 1985 (Table 2).

Loan Experience of Agricultural Banks

With farm loan delinquency and charge off rates rising, total loan experience has been deteriorating at banks that are heavily involved in farm lending. About 4,800 of the nation's banks can be characterized as "agricultural banks"—their ratio of farm loans to total loans is above the unweighted average of such ratios at all banks, which was 16.21 percent as of June 30, 1986. At agricultural banks as a group, farm loans constituted 35.2 percent of total loans, far above the average of 3.3 percent in the banking system as a whole.

Delinquent Loans

Delinquency rates on total loans at agricultural banks have been trending upward since banks first reported the data in December 1982, as shown in Figure 2.

Table 2. Net Charge Offs of Farm Production Loans, Insured Commercial Banks

Period	Estimated Amount, Millions of Dollars	As Percentage of Farm loans Outstanding at End of Period
Annual		
1984	900	2.2
1985	1300	3.7
Quarterly		
1984		
Q1	120	.3
Q2	160	.4
Q3	195	.5
Q4	425	1.0
1985		
Q1	200	.5
Q2	320	.8
Q3	255	.6
Q4	525	1.5
1986		
Q1	235	.7
Q2	355	1.0
First Half of Year		
1984	280	.7
1985	520	1.3
1986	590	1.7

Data are estimates of national charge offs of farm nonreal estate loans, based on reports from banks that hold about 94 percent of the outstanding national volume of such loans. Additional uncertainty of the estimates arises because small banks report only charge offs of "agricultural" loans as defined by each bank for its internal purposes. Banks first reported the data in the March 1984 *Report of Income*.

Almost all of the increase in total delinquencies has consisted of nonaccrual loans, as other past due loans rose only slightly.

Beginning in June 1985, those banks have been required to report all of their farm loan delinquencies, as also shown in the chart. Delinquency rates on total loans are below those on farm loans alone; in particular, the proportion of loans in nonaccrual status is much lower. Thus the lower delinquency rates on nonfarm loans at those banks have been helping to mitigate the adverse trend in the quality of their farm loans, indicating that even the limited diversification of loans at highly agricultural banks has helped their financial condition.

Figure 2. Delinquency and Charge Off Rates on Loans at Agricultural Banks

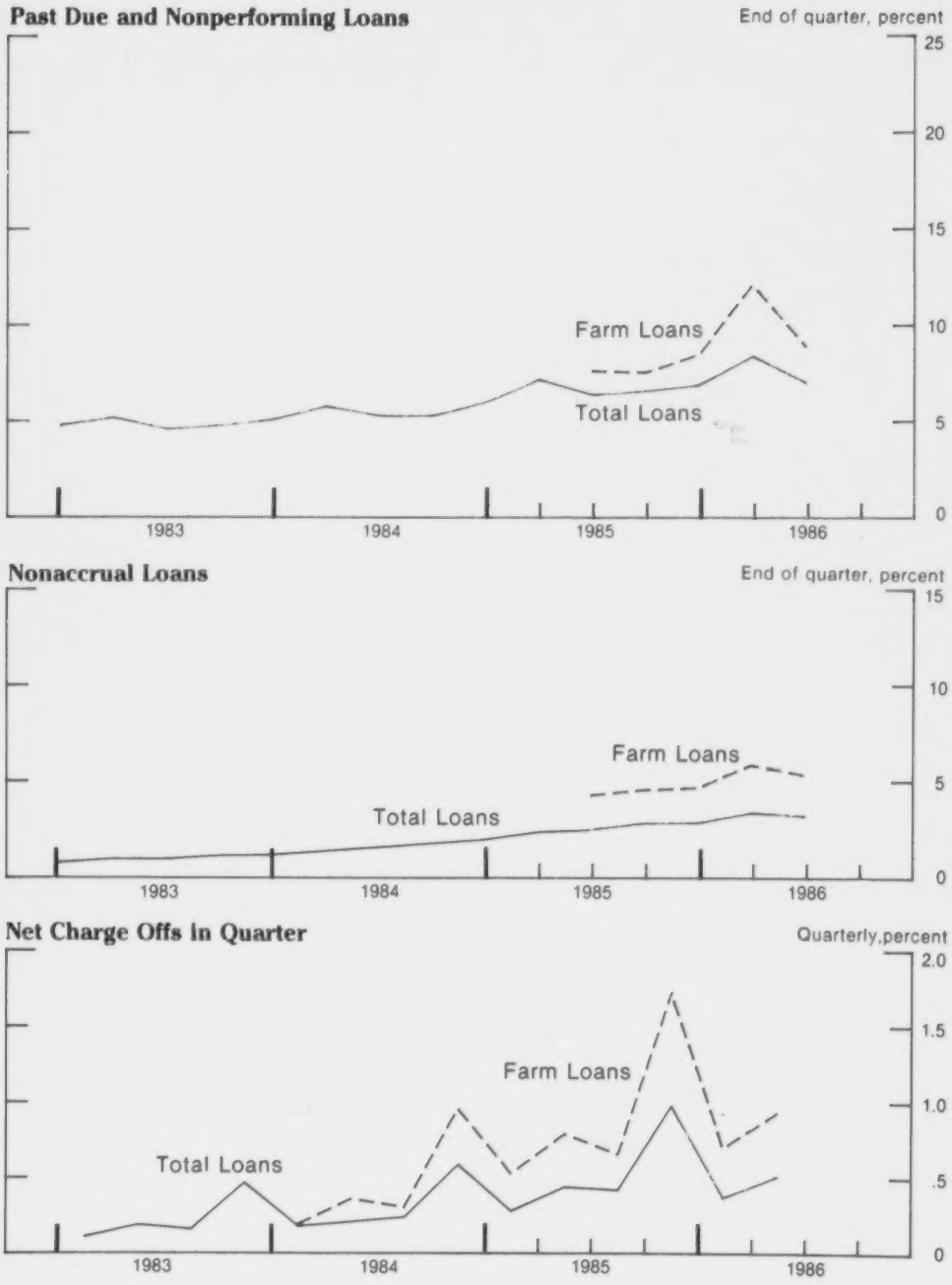


Table 3. Delinquent Loans as a Percentage of Total Loans Outstanding, Agricultural Banks,[a] June 30

Type of delinquency	1983	1984	1985	1986
		United States		
Total	4.6	5.3	6.4	7.0
Past Due 30 to 89 Days and Still Accruing	2.0	2.1	2.2	2.2
Nonperforming	2.7	3.2	4.1	4.7
Past Due 90 Days or More and Still Accruing	1.6	1.6	1.6	1.6
Nonaccrual	1.0	1.6	2.5	3.1
		Iowa		
Total	4.1	5.2	6.7	7.2
Past Due 30 to 89 Days and Still Accruing	1.5	1.7	1.9	1.7
Nonperforming	2.6	3.4	4.8	5.5
Past Due 90 Days or More and Still Accruing	1.6	1.7	1.8	1.9
Nonaccrual	1.0	1.7	3.1	3.6

[a]Agricultural banks are insured commercial banks at which the ratio of farm loans to total loans is above the unweighted average of such ratios at all insured commercial banks (16.21 percent on June 30, 1986). Farm loans were 35.2 percent of total loans at agricultural banks on June 30, 1986, and those banks held 58.6 percent of all farm loans in the banking system. Farm loans at all banks totaled $46.4 billion, or 3.3 percent of total loans at all banks.

Agricultural banks with relatively high problem loans are concentrated in a dozen contiguous states—Montana, Wyoming, Colorado, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Wisconsin, Iowa, and Missouri. In each of those states, the ratio of nonaccrual loans to total loans at agricultural banks exceeded the national average of 3.1 percent on June 30, 1986 (Table 3). In the lower portions of Tables 3 and 4, data for Iowa are shown to illustrate the loan experience of agricultural banks in that region.

The relatively poorer loan experience of agricultural banks in the region is a recent development. Two to three years ago, their average loan experience differed little from that of agricultural banks elsewhere. Since then, their relative levels of nonaccrual loans and of loan charge offs have climbed substantially above the national averages for agricultural banks.

Loan Losses

Total loan losses at agricultural banks nationally have been trending upward as shown in the lower panel of Figure 2. As with delinquencies, losses on farm loans have been relatively greater than the losses on other loans at those banks.

At all agricultural banks, net charge offs of all loans in 1985 averaged 2.12 percent of outstandings, compared to 1.22 percent in 1984 (Table 4). In the first half of 1986, charge offs were somewhat higher than those in the corresponding period of 1985, but the increase was much below the sharp rise of that year. During the last two years, losses at agricultural banks in the stressed Midwestern region were substantially higher than at such banks nationally, as illustrated by the data for Iowa in Table 4.

Table 4. Net Charge Offs as a Percentage of Total Loans Outstanding at End of Period, Agricultural Banks[a]

Area and Year	First Half	Full Year
United States		
1980	.07	.32
1981	.09	.43
1982	.15	.69
1983	.30	.93
1984	.39	1.22
1985	.72	2.12
1986	.86	
Iowa		
1980		.31
1981		.34
1982		.67
1983		.92
1984		1.71
1985	1.31	3.49
1986	1.64	

[a]Agricultural banks are defined in the note to Table 3.

Variation Among Agricultural Banks

Both delinquencies and losses are distributed unevenly among agricultural banks. Many agricultural banks have low levels of problem loans and losses, while a relatively small number have very high levels that are pulling up the average. At roughly two-thirds of the banks, relative levels of nonperforming loans and of net loan charge offs are below the averages that have been cited.

Although still relatively small, the proportion of agricultural banks with very high levels of problem loans and of loan losses has been rising in recent years. As shown in Table 5, on June 30, 1986, nonperforming loans represented 10 percent or more of total loans at just over one-tenth of agricultural banks. The proportion of agricultural banks experiencing serious loan losses has also increased, as shown in Table 6. In 1985, one-tenth of agricultural banks charged off 5 percent or more of their total loans, and one-fourth of the banks charged off at least 2.5 percent of their loans.

Income Experience of Agricultural Banks

Increases in loan losses and nonperforming loans have adversely affected the net income of agricultural banks. But those banks were relatively profitable for many years. From 1970 through 1982, their average return on equity hovered between 14 and 16 percent. Within that narrow range, their most profitable years were those in which market interest rates were high, and they thus reaped high rates of return on their short-term investments.

During the 1970s, loan losses at agricultural banks were very low each year—even years of general business recession—and only 1 percent of the banks reported negative earnings in any given year. In 1981, as loan charge offs started to climb, the proportion of agricultural banks reporting negative earnings began to rise, reaching 13 percent in 1984 and 18 percent in 1985 (Table 7). The average return to equity fell from 16 percent in 1980 to 6 percent in 1985. However, one-

Table 5. Distribution of Agricultural Banks[a] by Relative Nonperforming Loans

Nonperforming Loans as a Percentage of Total Loans	Percentage Distribution, June 30			
	1983	1984	1985	1986
Total	100.0	100.0	100.0	100.0
Under 2.0	56.0	47.4	38.8	32.4
2.0 to 4.9	30.9	33.2	33.4	33.5
5.0 to 9.9	10.9	15.4	20.0	23.3
10.0 to 14.9	1.7	2.8	5.5	6.6
15.0 to 19.9	.4	.7	1.4	2.6
20.0 and Over	.2	.5	.9	1.6

[a]Agricultural banks are defined in the note to Table 3.

Table 6. Distribution of Agricultural Banks[a] by Relative Net Charge Offs

Net Charge Offs as a Percentage of Total Loans	Percentage Distribution, June 30			
	1982	1983	1984	1985
Total	100.0	100.0	100.0	100.0
Under 0.10	27.7	25.2	18.5	10.6
0.10 to 0.49	32.0	28.2	23.6	14.5
0.50 to 0.99	19.9	20.5	20.0	18.0
1.00 to 2.49	15.8	18.6	23.9	30.2
2.50 to 4.99	3.5	5.5	9.2	16.1
5.00 and Over	1.0	2.1	4.8	10.5

[a]Agricultural banks are defined in the note to Table 3.

half of the banks still earned 10 percent or more on equity in 1985. And, as average net income remained positive, agricultural banks were able, through retention of earnings, to boost their capital at a faster rate than their assets were rising. As shown in the addenda to Table 7, the ratio of total capital to assets thus rose from 9.2 percent in 1980 to 9.6 percent at the end of 1985.

Table 8, which shows trends since 1970 in the way agricultural banks as a group earned and disposed of their income, further documents that, apart from loan losses, those banks have coped well with the banking environment of this decade. (In Table 8, all items of income, expense, and profit are expressed as a percentage of total assets. Levels and trends of those items in the text

Table 7. Percentage Distribution of Agricultural Banks[a] by Rate of Return to Equity

Net Income as Percentage of Average Equity at Bank	1977	1978	1979	1980	1981	1982	1983	1984	1985
All Banks	100	100	100	100	100	100	100	100	100
Negative	1	1	1	1	2	4	7	13	18
0 to 4	4	3	2	2	3	5	7	9	11
5 to 9	16	14	8	9	12	15	18	23	22
10 to 14	45	46	36	33	33	33	36	36	33
15 to 19	28	28	38	35	32	28	24	15	13
20 to 24	5	6	12	14	13	11	7	3	3
25 and Over	1	1	3	5	6	4	2	1	1
Addenda									
Average Rate of Return to Equity	14%	14%	15%	16%	15%	14%	11%	8%	6%
Net Charge Offs as Percentage of Total Loans	.2%	.2%	.2%	.3%	.4%	.7%	.9%	1.2%	2.1%
Average Capital Ratio,[b] Dec. 31	8.7%	8.9%	9.0%	9.2%	9.2%	9.3%	9.4%	9.5%	9.6%

[a]Agricultural banks are defined in the note to Table 3.

[b]Total primary and secondary capital (items available in bank reports as of the date specified) as a percentage of total assets.

Table 8. Income, Expenses, and Profits of Agricultural Banks as a Percentage of Total Assets

Item	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Interest Income	5.5	5.4	5.1	5.2	6.4	6.3	6.6	6.7	7.0	7.8	9.3	11.0	11.4	10.3	10.6	10.0
- Interest Expense	2.1	2.3	2.3	2.5	3.0	3.1	3.3	3.4	3.6	4.1	5.3	7.1	7.5	6.5	6.9	6.2
= Net Interest Margin	3.3	3.2	2.8	2.7	3.5	3.2	3.3	3.3	3.5	3.7	4.0	4.0	3.9	3.8	3.7	3.8
+ Noninterest Income	.4	.4	.3	.3	.3	.3	.3	.3	.4	.4	.4	.5	.5	.5	.5	.5
- Noninterest Expense, (Excluding Loan Losses)	2.2	2.2	2.1	2.0	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.6	2.6	2.6	2.7
= Net Income Before Loan Losses	1.5	1.4	1.2	1.5	1.7	1.4	1.4	1.4	1.6	1.8	2.0	1.9	1.8	1.7	1.6	1.7
- Provision for Loan Losses	.1	.1	.1	.1	.1	.1	.1	.1	.2	.2	.2	.3	.4	.6	.8	1.2
= Net Income Before Taxes	1.4	1.2	1.1	1.4	1.5	1.3	1.3	1.3	1.4	1.5	1.7	1.6	1.4	1.1	.8	.6
- Income Taxes	.4	.3	.3	.4	.4	.3	.2	.3	.3	.3	.4	.4	.3	.2	.1	.0
= Net Income	.8	.9	.9	1.0	1.1	1.0	1.1	1.0	1.1	1.2	1.3	1.2	1.1	1.0	.7	.5
- Cash Dividends	.3	.3	.2	.2	.2	.2	.3	.2	.3	.3	.3	.4	.4	.4	.4	.4
= Retained Earnings	.7	.7	.7	.8	.9	.8	.8	.8	.8	.9	.9	.8	.7	.6	.3	.1

that follows refer to those ratios instead of the aggregate dollar amounts.) Agricultural banks performed well during the introduction of money market certificates of deposit in the late 1970s, even though that innovation led to a marked increase in their interest expense when interest rates rose in national money markets and depositors shifted funds into those certificates. The banks increased their interest income even more rapidly, helped in 1980 and 1981 by relatively high yields on assets invested in short-term securities. After 1981, their net interest margin declined toward the level that prevailed before the unusually profitable 1980–81 period; that is, interest received fell somewhat more than interest paid to depositors. (Tables 9 and 10 provide data on interest rates charged on nonreal estate farm loans made by all banks).

After factoring in noninterest income and expenses—both are less important at agricultural banks than at other banks—relative total net income before provision for loan losses also declined somewhat from its peak in 1980. But the provision for loan losses increased sharply after 1980, reaching 1.2 percent of assets in 1985, and before-tax income bore the full brunt of that increase. Average income taxes fell almost to zero in 1985 as many agricultural banks received refunds under the provision that permits banks to carry losses back as much as ten years on their federal tax returns. In effect, therefore, the reduction in income taxes absorbed roughly one-third of the increase in loan losses. Although after-tax income fell considerably from its peak in 1980, it remained high enough to permit the agricultural banks to pay dividends to their stockholders at the rate in effect since 1981. (On average, even the agricultural banks with operating losses paid dividends in 1985, although at less than half the rate of the banks with operating profits.) By 1985, however, the margin by which dividends are covered was slim, and so the banks added relatively little in retained earnings to their capital.

At 9.6 percent of assets, however, the average capital ratio at agricultural banks is about a full percentage point above that at other small banks. Furthermore, average capital ratios are highest (and have been rising most rapidly) at the more heavily agricultural of the agricultural banks. Total capital averages more than 10 percent of assets at banks at which more than half of loans are farm loans.

Table 9. Average Effective Interest Rate[a] on Nonreal Estate Farm Loans Made by Commercial Banks

Period	All Banks	Large Banks	Other Banks
Annual			
1977	8.8%	8.5%	9.0%
1978	9.6	10.2	9.4
1979	11.9	13.6	11.4
1980	15.2	16.2	15.0
1981	18.5	19.8	18.1
1982	16.7	16.1	17.0
1983	13.5	12.1	14.1
1984	14.1	13.1	14.4
1985	12.8	11.2	13.4
Quarterly			
1983			
Q1	13.8%	12.5%	14.1%
Q2	13.2	12.0	13.9
Q3	13.6	12.2	14.1
Q4	13.6	11.8	14.2
1984			
Q1	13.5	12.2	14.1
Q2	14.2	13.3	14.5
Q3	14.8	14.4	14.9
Q4	14.2	13.4	14.4
1985			
Q1	13.2	11.7	13.8
Q2	13.0	11.5	13.6
Q3	12.3	10.6	12.9
Q4	12.3	10.6	13.1
1986			
Q1	12.0	10.3	12.8
Q2	11.5	9.7	12.0
Q3	11.4	9.3	12.1

[a]Effective rates shown are estimates from the Federal Reserve survey of terms of bank lending to farmers.

In recent quarters, most "large banks" (survey strata one to three) had over $600 million in total assets, and most "other banks" (survey strata four to six) had total assets below $600 million.

The favorable capital position provides a valuable cushion for coping with adverse loan experience. But if a bank experiences relatively large loan losses in a short period of time and thus cannot cover them from current earnings, the capital of the bank can be depleted rapidly. At agricultural banks,

Table 10. Percentage Distribution[a] of Nonreal Estate Farm Loans Made by Banks, by Effective Interest Rate

Effective Interest Rate (Percent)	August										Aug.	Nov.	Feb.	May	Aug.
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1985	1985	1986	1986	1986
All Loans	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Under 6.0	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6.0 to 6.9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.0 to 7.9	11	—	—	—	—	—	—	—	—	1	—	—	—	1	1
8.0 to 8.9	48	20	2	—	—	—	—	—	3	11	3	1	8	6	11
9.0 to 9.9	34	50	11	—	—	—	—	—	9	15	9	16	5	12	15
10.0 to 10.9	4	22	29	1	—	—	4	—	12	12	12	7	7	11	12
11.0 to 11.9	—	6	33	10	—	1	8	—	13	16	13	13	21	33	16
12.0 to 12.9	—	1	14	17	1	7	22	4	18	25	18	21	23	22	25
13.0 to 13.9	—	—	7	43	—	1	20	16	36	16	36	33	33	13	16
14.0 to 14.9	—	—	5	19	1	2	35	32	6	3	6	7	7	2	3
15.0 to 15.9	—	—	1	9	2	11	8	42	1	1	1	1	1	—	1
16.0 to 16.9	—	—	—	1	5	23	1	5	1	—	1	—	—	—	—
17.0 to 17.9	—	—	—	1	14	30	—	—	—	—	—	—	—	—	—
18.0 to 18.9	—	—	—	—	16	21	—	—	—	—	—	—	—	—	—
19.0 to 19.9	—	—	—	—	28	2	—	—	—	—	—	—	—	—	—
20.0 to 20.9	—	—	—	—	11	1	—	—	—	—	—	—	—	—	—
21.0 to 21.9	—	—	—	—	7	—	—	—	—	—	—	—	—	—	—
22.0 to 22.9	—	—	—	—	6	—	—	—	—	—	—	—	—	—	—
23.0 to 23.9	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—
24.0 to 24.9	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—
25.0 and Over	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—

[a]Percentage distribution of the total dollar amount of nonreal estate farm loans of $1,000 or more made by insured commercial banks during the week covered by the survey, which is the first full business week of the month specified.

Data are estimates from the Federal Reserve survey of terms of bank lending to farmers.

loans average roughly 50 percent of assets and capital about 10 percent of assets; therefore, loan losses equal to about one-fifth of outstanding loans would, on average, exhaust all capital. Increasing numbers of agricultural banks have encountered such loan experience, and the number of failures has risen.

Agricultural Bank Failures

The number of agricultural bank failures first became conspicuous during the spring and summer of 1984. In most quarters since, they have represented more than half of all failures of commercial banks (Table 11). The agricultural banks that have failed have been relatively small in size, however, and thus those failures generally have affected only the immediate communities. The sixty-eight agricultural banks that failed in 1985 had, on average, total assets of $21 million, only two-thirds the average size of all agricultural banks and only one-eighth the average size of all commercial banks. Only three had assets of more than $50 million, while twenty-three had assets of less than $10 million. Even though agricultural banks accounted for nearly three-fifths of bank failures last year, their assets were less than two-fifths of the assets at all failed banks. For the same reason, farm loans constituted only one-fifth of the total loans at all of the banks that failed—about $460 million of the total loans of $2.4 billion at failed banks.

In 1986, deterioration in the quality of several classes of nonfarm loans, particularly energy and commercial real estate loans, has reduced the relative importance of agricultural banks and farm loans in the data on bank failures. Through November 15, there have been sixty-two failures of agricultural banks; thus the total number of such failures in 1986 is likely to be about the same as in 1985. Agricultural banks have accounted for 49 percent of bank failures, down from 59 percent last year. And, farm loans have constituted only 13 percent of total loans at all failed banks, compared to 19 percent in 1985 (Table 11).

Disruption of Borrower Relationships

Problems faced by farm borrowers when their bank fails have been well documented by the rural media. Even borrowers in relatively good financial condition experience

Table 11. Agricultural Bank Failures and Farm Loans at Failed Commercial Banks

Period	Number of Bank Failures			Farm Loans at All Failed Banks	
	Total	Agricultural Banks	Agricultural as Percentage of Total	Millions of Dollars	As Percentage of Total Loans
Annual					
1981	7	1	14	3	4
1982	35	11	31	49	3
1983	45	7	16	62	2
1984	78	32	41	199	10
1985	118	68	58	459	19
1986[a]	126	62	49	646	13
Quarterly					
1981					
Q1	3	1	33		
Q2	1	0	0		
Q3	1	0	0		
Q4	2	0	0		
1982					
Q1	5	2	40		
Q2	10	3	30		
Q3	11	3	27		
Q4	9	3	33		
1983					
Q1	11	1	9		
Q2	15	1	7		
Q3	12	2	17		
Q4	7	3	43		
1984					
Q1	13	3	23		
Q2	30	7	23		
Q3	17	10	59		
Q4	18	12	67		
1985					
Q1	20	12	60		
Q2	32	21	66		
Q3	33	17	52		
Q4	33	18	55		
1986					
Q1	26	14	54	84	10
Q2	38	15	39	162	14
Q3	42	23	55	318	13

[a]Data through November 15, 1986. Data for 1986 include three banks assisted to prevent closing. Agricultural banks are defined in the note to Table 3.

some inconvenience, at the least, as they must document their financial position and history to new and understandably wary lenders. But the failure is likely to pose a very serious problem for borrowers whose loans are delinquent or who are in a weak financial condition. Such borrowers may find it difficult, if not impossible, to find a new lender. Often, the Federal Deposit Insurance Corporation (FDIC) faces the unpleasant task of foreclosing on their loans.

Community Disruption

Because most deposits at agricultural banks are fully insured, most failures of such banks

have minimal disruptive effects on the community at large. In most cases the FDIC is able to arrange an acquisition or merger and the offices of the failed bank are reopened immediately. Local disruption is greater when the FDIC is unable to arrange for another bank or a new bank to take over the deposits and the good loans and other assets immediately after the failure occurs. Both depositors and borrowers must then seek new banking relationships. There were twenty-two cases of such deposit payoffs in 1985 (including seventeen agricultural banks), and twenty-one in 1986 through November 15 (including ten agricultural banks).

Observers have expressed most concern about cases of failure and deposit payoff at the only bank in a community, which causes immediate general disruption and has a longer-term negative effect if the bank is not replaced. However, such cases have occurred only in very small communities—which helps to explain why the FDIC did not find anyone interested in continuing or establishing a bank or branch office. In 1985, when there were twelve such deposit payoffs (eleven were agricultural banks), the populations of the communities involved ranged from eighty to six hundred, and the combined population of all twelve communities was only 4,200. In 1986, through November 15, there were only seven cases of deposit payoff after failure of the only bank in the community. Five were agricultural banks in communities whose populations ranged from a hundred to four hundred forty. Two were nonagricultural banks in rural towns with populations of about a thousand and two thousand, respectively. A phone call to a reporter at the local paper in the latter town (how satisfying to turn the tables on the press!) indicated that unusually large amounts of nonlocal deposits and nonlocal problem loans probably made the failing bank an unattractive acquisition, and another bank opened a branch in the town immediately after the failure occurred, thus local banking services were continued. The latter event, not mentioned in the FDIC's press release announcing the failure, raises the possibility that a similar event may have occurred in some of the other eighteen communities in which a sole bank failed during the last two years.

Potential Community Benefits

Rural communities that have retained local banking services after their economic life has been disrupted by a bank failure may experience some future recompense. In making good on the deposits of the bank that failed, the FDIC uses its insurance fund to replace the bad loans in the bank's portfolio. Thus the local bank or banks that receive the deposits also receive good assets to back those deposits, often including substantial amounts in cash. Such banks are thus placed in better position to consider future lending opportunities as they arise and to use future earnings to increase their capital and to improve their banking services. In contrast, had the troubled bank managed to survive, some of the banking resources of the community would have remained tied up in the old, poorly performing loans, and some future bank earnings would have been dedicated to covering losses on those loans.

Vulnerable Banks

In recent years, a large majority of failed banks had earlier reported a relatively high level of delinquent loans. The ratio of nonperforming loans to total capital seems a particularly appropriate indicator of the possibility that a bank may fail because of large loan losses—depending, of course, on what proportion of the nonperforming loans cannot be collected. Table 12 shows that more agricultural banks have been moving into vulnerable positions as indicated by that ratio. However, most agricultural banks remain in relatively good position; at two-thirds of the banks, nonperforming loans amounted to less than one-fourth of total capital on June 30, 1986. At 197 agricultural banks and 167 other banks, nonperforming loans exceeded total capital; banks in that position are herein called "vulnerable banks." Their number has been trending upward, as shown in the middle panel of Figure 3. And, as long as the number of vulnerable banks continue to rise, it is likely that the number of failures (shown in the lower panel) may also tend to increase.

Although agricultural banks account for more than half of all vulnerable banks, the other vulnerable banks tend to be much larger. Thus, as shown in the last column of Table 13, farm loans constituted only 10 percent of total loans at all vulnerable banks on June

Table 12. Distribution of Agricultural Banks[a] by Ratio of Nonperforming Loans to Total Capital

Nonperforming Loans as a Percentage of Total Capital	Percentage Distribution, June 30			
	1983	1984	1985	1986
All Banks	100.0	100.0	100.0	100.0
Under 25	83.6	76.3	69.0	66.6
25 to 49	12.5	16.3	19.6	19.4
50 to 74	2.3	4.4	6.1	6.8
75 to 99	.9	1.6	2.3	3.0
100 to 124	.3	.6	1.3	1.4
125 to 149	.1	.3	.8	.8
150 to 174	*	.2	.4	.6
175 to 199	.1	.1	.2	.3
200 and Over**	.2	.2	.4	1.0

*Less than 0.05 percent.

**Includes banks with negative capital.

[a]Agricultural banks are defined in the note to Table 3.

30, 1986. Farm loans totaled $1.5 billion, whereas other loans totaled $12.4 billion.

In five of the eleven states with ten or more vulnerable banks—California, Colorado, Louisiana, Oklahoma, and Texas—the low average farm loan ratio at vulnerable banks indicates that farm credit problems were not the main factor in the loan problems being experienced by those banks. Farm loans were less than a tenth of total loans at vulnerable banks in each of the five states—Alaska, California, Louisiana, Oklahoma, and Texas—in which such banks held significantly more than $500 million in total loans. Thus, in terms of dollar amounts rather than number of individual banks, vulnerable nonagricultural banks overshadow their agricultural counterparts.

Trends in the number of vulnerable banks are shown in Table 14. During the year ended June 30, 1986, the increase in the number of vulnerable agricultural banks slowed to fifty-three banks, compared to an increase of seventy-six banks during the preceding twelve-month period. In contrast, the increase in the number of other vulnerable banks doubled, from twenty-seven to fifty-five banks. The amounts of loans at those banks exhibited parallel changes, as shown in the addendum to Table 14.

In the year ended June 30, 1986, the number of vulnerable agricultural banks doubled in Minnesota, while many states shared the rest of the national increase. Minnesota's thirty-five vulnerable agricultural banks placed it well above other states with double-digit totals—Iowa, twenty-three; Missouri, twenty; Kansas, eighteen; Nebraska, fourteen; Oklahoma, eleven; and Montana, ten. Oklahoma and Texas showed striking increases in the number of vulnerable nonagricultural banks, while California and Minnesota showed smaller gains. Those four states accounted for virtually all of the national increase in the number of vulnerable nonagricultural banks. In total number of all vulnerable banks, Texas led with fifty-six banks (including only nine agricultural banks), followed by Minnesota (forty-two total, thirty-five agricultural) and Oklahoma (thirty-eight total, eleven agricultural).

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Figure 3. Number of Vulnerable Banks and Bank Failures

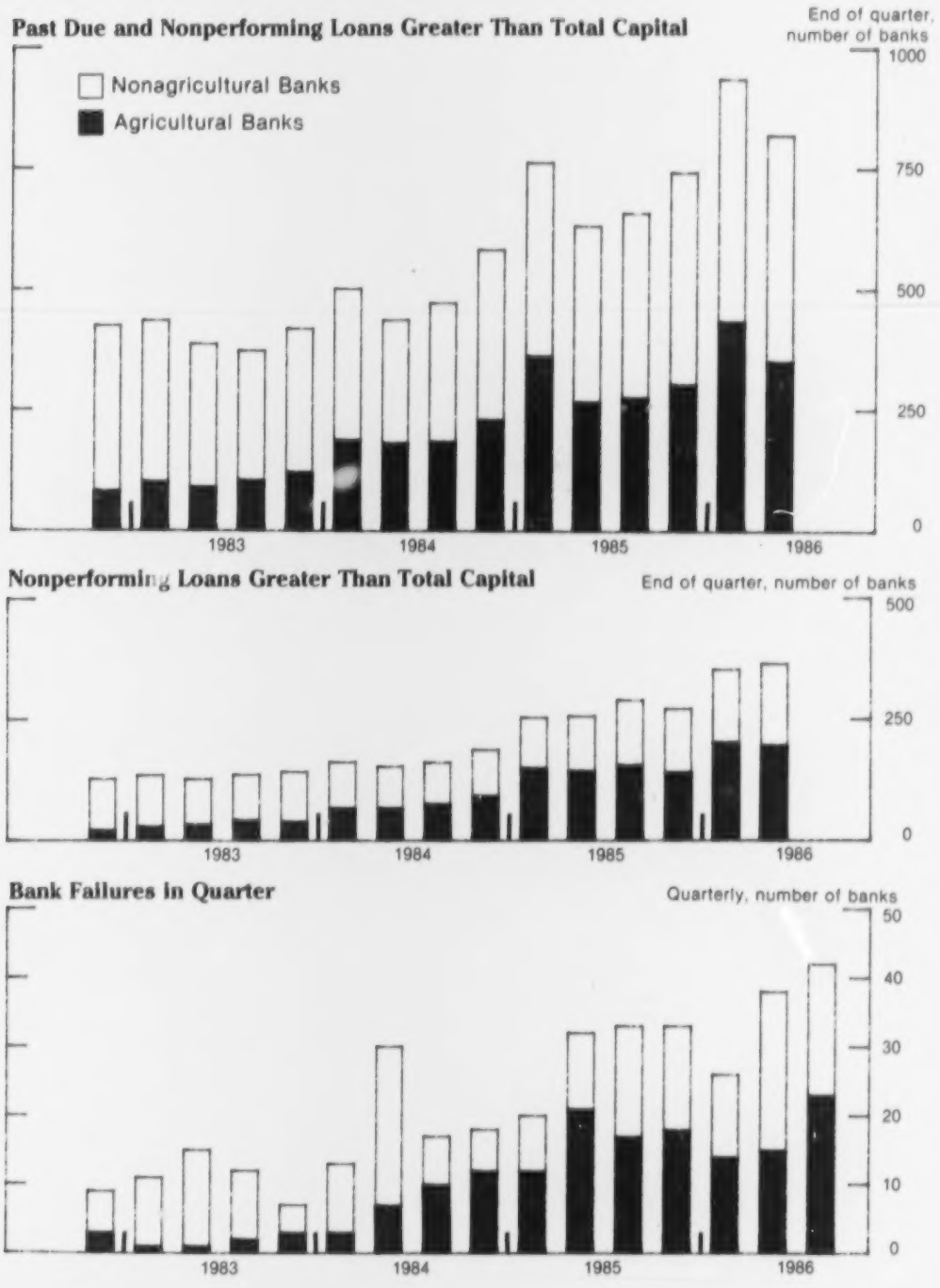


Table 13. Banks at Which Nonperforming Loans Exceeded Total Capital, June 30, 1986

State	Number of Banks	As Percentage of all Banks in State	Loans at These Banks (Millions of Dollars) Total	Farm	Farm Loans as Percentage of Total Loans
US	364	2	13,899	1,452	10
AL	1	*	10	1	7
AK	4	25	1,149	3	*
AZ	—	—	—	—	—
AR	1	*	16	8	49
CA	18	4	1,756	18	1
CO	21	5	333	31	9
CT	—	—	—	—	—
DE	—	—	—	—	—
DC	—	—	—	—	—
FL	5	1	368	1	*
GA	1	*	7	*	*
HI	—	—	—	—	—
ID	1	4	71	16	22
IL	7	1	123	52	42
IN	6	2	120	34	28
IA	24	4	466	203	44
KS	19	3	277	93	34
KY	3	1	39	7	17
LA	22	7	957	47	5
ME	—	—	—	—	—
MD	—	—	—	—	—
MA	—	—	—	—	—
MI	2	1	230	59	26
MN	42	6	501	184	37
MS	1	1	20	3	16
MO	21	3	330	93	28
MT	13	8	175	54	31
NE	14	3	208	106	51
NV	1	6	14	—	—
NH	—	—	—	—	—
NJ	1	1	38	—	—
NM	6	6	368	29	8
NY	—	—	—	—	—
NC	—	—	—	—	—
ND	7	4	92	47	51
OH	—	—	—	—	—
OK	38	7	1,714	156	9
OR	3	5	33	3	10
PA	—	—	—	—	—
RI	—	—	—	—	—
SC	—	—	—	—	—
SD	9	7	98	59	60
TN	3	1	110	12	11
TX	56	3	3,872	72	2
UT	2	3	22	3	16
VT	—	—	—	—	—
VA	—	—	—	—	—
WA	2	2	32	11	33
WV	—	—	—	—	—
WI	3	1	45	24	52
WY	7	6	323	25	8

*Less than 0.5

Table 14. Number of Banks at Which Nonperforming Loans Exceeded Total Capital, June 30

State	All Banks				Agricultural Banks[a]				Nonagricultural Banks			
	1983	1984	1985	1986	1983	1984	1985	1986	1983	1984	1985	1986
US	127	153	256	364	34	68	144	197	93	85	112	167
AL	—	—	—	1	—	—	—	—	—	—	—	1
AK	—	—	1	4	—	—	—	—	—	—	1	4
AZ	1	—	—	—	—	—	—	—	1	—	—	—
AR	2	6	1	1	1	2	1	1	1	2	—	—
CA	16	6	10	18	—	—	—	1	16	6	10	17
CO	2	8	17	21	1	5	6	9	1	3	11	12
CT	—	—	—	—	—	—	—	—	—	—	—	—
DE	—	—	—	—	—	—	—	—	—	—	—	—
DC	—	—	—	—	—	—	—	—	—	—	—	—
FL	1	5	5	5	—	1	—	—	1	4	5	5
GA	1	—	1	1	1	—	—	—	—	1	1	1
HI	—	1	—	—	—	—	—	—	—	1	—	—
ID	1	—	1	1	—	—	1	1	1	—	—	—
IL	14	7	4	7	2	2	4	6	12	5	—	1
IN	2	5	7	6	—	2	4	5	2	3	3	1
IA	4	6	16	24	4	5	16	23	—	1	—	1
KS	3	6	18	19	2	5	15	18	1	1	3	1
KY	5	2	4	3	3	—	2	2	2	2	2	1
LA	6	7	19	22	—	1	3	5	6	6	16	17
ME	—	—	—	—	—	—	—	—	—	—	—	—
MD	—	—	—	—	—	—	—	—	—	—	—	—
MA	—	—	—	—	—	—	—	—	—	—	—	—
MI	2	1	2	2	1	1	2	2	1	—	—	—
MN	6	6	20	42	1	2	17	35	5	4	3	7
MS	1	—	1	1	—	—	—	—	1	—	1	1
MO	2	8	16	21	2	7	15	20	—	1	1	1
MT	4	3	8	13	3	3	6	10	1	—	2	3
NE	4	15	17	14	4	15	17	14	—	—	—	—
NV	—	—	—	1	—	—	—	—	—	—	—	1
NH	—	—	—	—	—	—	—	—	—	—	—	—
NJ	2	—	1	1	—	—	—	—	2	—	1	1
NM	—	—	4	6	—	—	—	1	—	—	4	5
NY	2	—	1	—	—	—	—	—	2	—	1	—
NC	—	—	—	—	—	—	—	—	—	—	—	—
ND	1	1	4	7	1	1	4	6	—	—	—	1
OH	—	2	1	—	—	—	—	—	—	2	1	—
OK	6	8	17	38	2	2	9	11	4	6	8	27
OR	5	7	2	3	1	3	1	2	4	4	1	1
PA	—	1	1	—	—	1	1	—	—	—	—	—
RI	—	—	—	—	—	—	—	—	—	—	—	—
SC	—	—	—	—	—	—	—	—	—	—	—	—
SD	—	2	3	9	—	2	3	9	—	—	—	—
TN	14	17	7	3	1	2	2	1	13	15	5	2
TX	5	9	22	56	1	—	4	9	4	9	18	47
UT	3	4	5	2	1	2	—	1	2	2	5	1
VT	1	—	—	—	—	—	—	—	1	—	—	—
VA	1	2	—	—	—	—	—	—	1	2	—	—
WA	3	—	2	2	—	—	1	1	3	—	1	1
WV	1	1	1	—	—	—	—	—	1	1	1	—
WI	3	5	9	3	2	4	9	3	1	1	—	—
WY	3	4	8	7	—	—	1	1	3	4	7	6
Addendum												
Loans at These Banks, U.S., Billions of Dollars:												
Farm	.5	.6	1.1	1.5	.2	.5	1.0	1.3	.2	.1	.1	.2
Total	12.3	4.7	7.5	13.9	.6	1.1	2.3	3.1	11.7	3.6	5.2	10.8

[a]Agricultural banks are defined in the note to Table 3.

Appendix 1

Farm loan delinquencies at the FmHA. Because it is part of the federal government, the Farmers Home Administration (FmHA) is not subject to financial stress from farm loan delinquencies and losses.[1] However, the delinquency rates on its farm loans are of analytical interest as they supplement knowledge of the financial condition of farmers that was presented by J. Johnson, Morehart, and Erickson.

As of September 30, 1986, FmHA had direct and guaranteed loans outstanding to 274,000 farm borrowers, of which 28 percent were behind on their scheduled payments. Both the number of borrowers and the proportion behind on payments were about the same as in September of the two preceding years.

The principal amount of outstanding farm loans totaled $29.6 billion. The principal amount of the direct loans totaled $27.9 billion, and that of the guaranteed loans totaled $1.7 billion.

Of the direct farm loans, $27.6 billion was to individuals, with the remainder being loans to grazing, recreation, and other farm associations. Of those direct loans to individuals, delinquent borrowers owed $12 billion, or 43 percent.

Of the guaranteed loans totaling $1.7 billion, delinquent borrowers owed $0.1 billion, or 5 percent.

Table 1 shows how those principal amounts outstanding and delinquent are distributed among the major FmHA farm loan programs.

FmHA also provides data on the amount of past due payments of principal and interest, which totaled $6.3 billion on its farm loans as of September 30, 1986. No other farm lending institutions compile and publish data on the amount of past due payments.

[1]This section uses data from FmHA reports 616 and 4067-C showing loan conditions as of September 30, 1986, with payments on direct loans credited as of October 20, 1986.

Table 1. Outstanding and Delinquent Farm Loans at the FmHA

Type of Loan	All Borrowers	Delinquent Borrowers	Delinquency Rate
	Principal Outstanding		
	Billions of Dollars		*Percentage Delinquent*
Direct Loans	27.6	12.0	43
Farm Ownership	7.7	2.1	27
Operating	6.3	1.7	27
Emergency	9.4	5.9	63
Economic Emergency	3.9	2.2	56
Soil and Water	.3	.1	38
Guaranteed Loans	1.7	.1	5
Farm Ownership	.2	*	9
Operating	1.2	*	3
Economic Emergency	.2	*	16
	Number of Borrowers		
	Thousands		*Percentage Delinquent*
Direct Loans			
Farm Ownership	124	28	22
Operating	120	37	31
Emergency	113	44	39
Economic Emergency	48	22	45
Soil and Water	16	4	27
Guaranteed Loans			
Farm Ownership	1	**	8
Operating	10	**	3
Economic Emergency	1	**	15

*Less than $50 million.
**Less than 500 borrowers.
Total amounts of direct and guaranteed loans include other minor programs.
Number of borrowers shown should not be summed, as many borrowers are in more than one of the programs listed.

Impact of the Farm Financial Crisis on the Retail and Service Sectors of Rural Communities

Kenneth E. Stone

Rural communities have been experiencing gradually declining sales in their business districts for many years. The basic reason for the loss of retail trade is the continual loss of economic base in rural areas caused by technology displacing farmers. However, the trend has been accelerating during recent years because of competition from regional shopping centers and improvements in transportation (better highways and more fuel-efficient motor vehicles) (Stone 1980). The farm financial crisis, which began in the early 1980s, has exacerbated the rural-to-urban shopping trends in many states.

The Shifts in Trade

The downward trend in retail and service sales in small towns in agricultural states was reversed temporarily during the farm boom of the early 1970s. For example, in Iowa, as indicated in Figure 1, the index of pulling power for towns between 500 and 1,000 population increased by 9 percent between 1972 and 1976, while towns of 1,001 to 5,000 gained 4 percent. Data were not available prior to 1976 for towns smaller than 500 population. Closer investigation of the resurgence of small towns reveals that the major beneficiaries were farm equipment dealerships, automobile dealerships, building materials stores, and other farm-related businesses. However, real sales in small towns started declining again after 1976 and dropped sharply after 1979. As Figure 1 indicates, the change in index of pulling power for small towns after 1976 was as follows.

Table 1. Changes in Retail Sales in Iowa Small Towns

n	Population	Percent Change in Pull Factor, 1976–85*
255	<500	-29%
186	500–1,000	-32
153	1,001–2,500	-22
42	2,501–5,000	-17

*Pull factor is the town per capita retail sales divided by state per capita retail sales. For example, if a town's per capita sales were $9,000 per year and the state average was $6,000, the town's pull factor is 1.5, derived by dividing $9,000 by $6,000. The interpretation is that, based on actual sales, the town is selling to the equivalent of 150 percent of the town's population in full-time customer equivalents.

The behavior of retail sales in towns above 5,000 population was somewhat different than that of small towns. Figure 2 shows that sales in most of the larger towns trended downward from 1972 to 1979. However, between 1979 and 1985 substantial *gains* in sales were made by many of the towns as shown in Table 2.

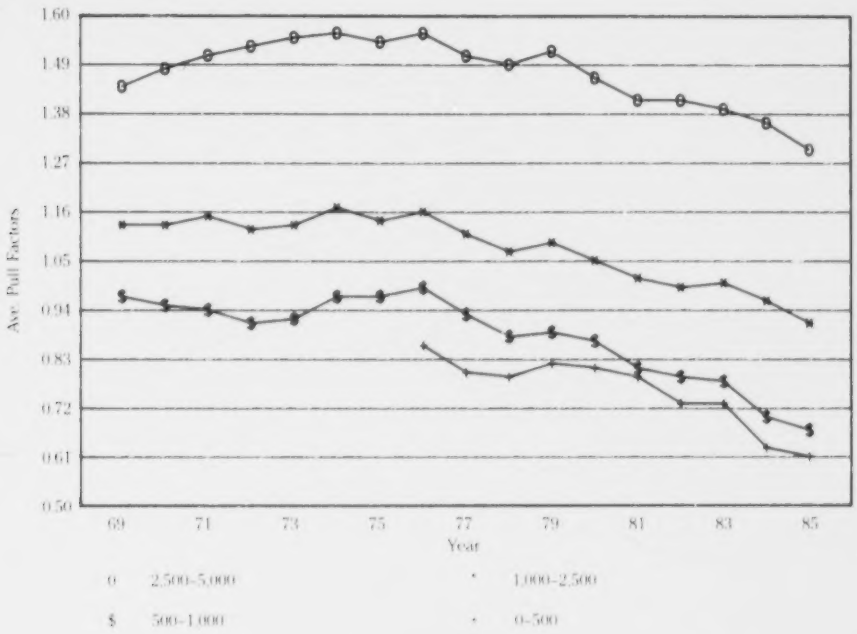
Table 2. Changes in Retail Sales in Iowa's Larger Towns and Cities

n	Population	Percent Change in Pull Factor, 1979–85
33	5,001–10,000	-2.8
6	10,001–25,000	1.4
6	25,001–50,000	14.0
6	50,000+	12.0

Comparable data from other states is not readily available, but various sources indicate similar trends in recent years. For example, in Illinois, real per capita sales tax collections in metropolitan counties increased by 16.6 percent from 1981 to 1985, compared to a 1.3 percent *decline* for rural agricultural counties (Chicoine). Figure 3 uses commercial data to compare real per capita sales for five other midwestern states

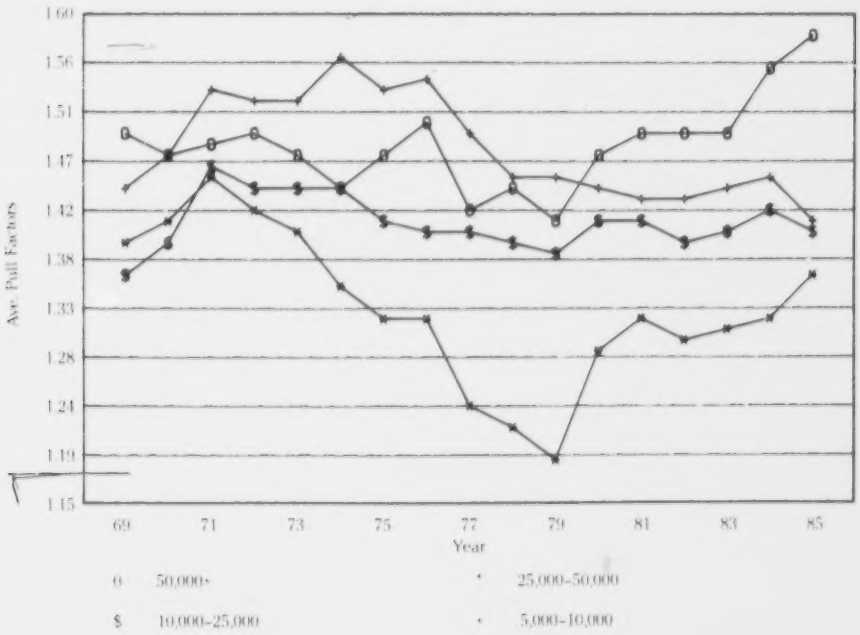
Kenneth E. Stone is a professor of economics at Iowa State University, Ames, Iowa.

Figure 1. Iowa Town Pull Factors



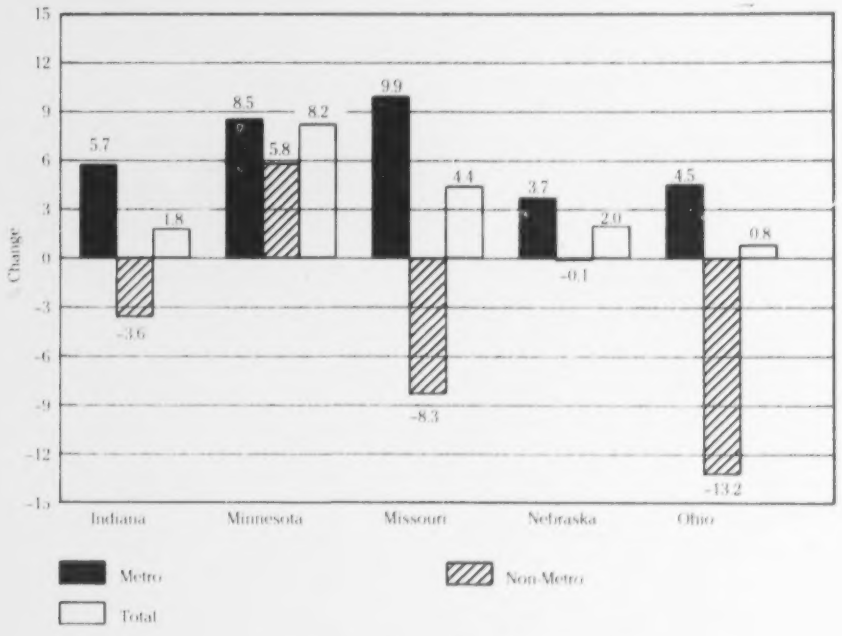
Source: *Iowa Retail Sales and Use Tax Report*

Figure 2. Iowa Town Pull Factors



Source: *Iowa Retail Sales and Use Tax Report*

Figure 3. Change in Real Per Capita Retail Sales, 1979–85



Source: *Surveys of Buying Power, Sales and Marketing Management* Magazine

from 1979 to 1985. In each case, the metropolitan counties outperformed the nonmetropolitan counties. Using weighted averages, it was found that the average gain for metropolitan counties was 6.2 percent, while the nonmetropolitan counties experienced average net *losses* of 5.2 percent.

The continued loss of retail trade in rural communities translates into loss of businesses. Based on average sales per firm, Table 3 shows estimates of loss of retail sales and loss of firms in Iowa towns up to 5,000 population (Stone 1986).

When this process continues unabated, regional trade centers develop in states. For example, in Iowa twenty counties had a net inflow of retail sales in 1985, while the remaining seventy-nine counties experienced net outflows of trade.

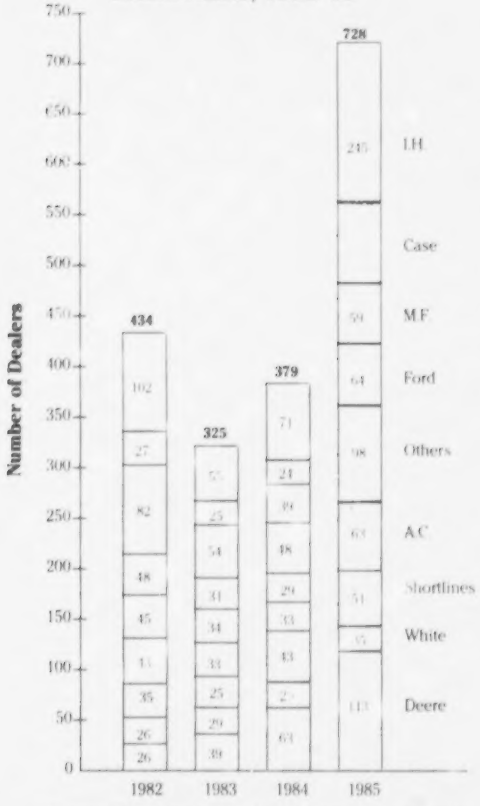
Table 3. Estimate of Loss of Small Town Firms in Iowa

Town Population	n=	1985 Average Loss of Sales Per Town (Compared to Sales in 1979)	State-Wide Total Loss of Sales in 1985 (Compared to 1979)	Firms Lost Per Town 1979–85	Total Firms Lost 1979–85
<500	255	$366,000	$93.3 mil	4	1,020
500–1,000	186	967,000	180.0 mil	10	1,860
1,001–2,500	153	1.8 mil	275.0 mil	15	2,295
2,501–5,000	42	4.8 mil	200.0 mil	32	1,344
Total			*748.3 mil*		*6,519*

Effects on Firms

Farm equipment dealerships have been among the hardest hit of all businesses in rural communities. Figure 4 shows the loss of U.S. dealerships by brand name from 1982 to 1985. The losses for 1985 were by far the worst of any year in recent history (approximately 9 percent) and were partially brought about by Tenneco Corporation's purchase of International Harvester and the subsequent closing of various Case and International Harvester dealerships. The loss over four years was approximately 19 percent and totaled 1,866 dealerships. The Iowa-Nebraska Farm Equipment Association reported that 106 of its Iowa members (nearly 18 percent) quit business in 1985 (Schwitters).

Figure 4. Yearly Losses of U.S. Farm Equipment Dealerships by Brand Name, 1982–85



Source: Farm Equipment Manufacturers Association

Figure 5 shows the improvement of net profits for farm equipment dealers during the early 1970s and the sharp declines during the early 1980s, when profits dropped below 1 percent of net sales for three years. Figure 6 gives more detail on net profits. For example, in 1979 the average U.S. dealer earned $30,358 (1.29 percent) on sales plus $55,832 (2.37 percent) other income (nonagricultural goods and services) for a total of $86,190 (3.66 percent). For 1984 and 1985, the average dealership experienced substantial net losses on sales and was able to salvage meager net operating profits through other income. In Iowa, the average dealer experienced a net operating *loss* of nearly $21,000 in 1984 and nearly $8,300 in 1985 (Iowa-Nebraska Farm Equipment Association).

Other farm-related businesses also suffered reduced sales corresponding to the downturn in agricultural prices. Representative changes in real sales in Iowa from 1979 to 1985 are shown in Table 4.

Table 4. Changes in Farm-Related Businesses in Iowa, 1979–85

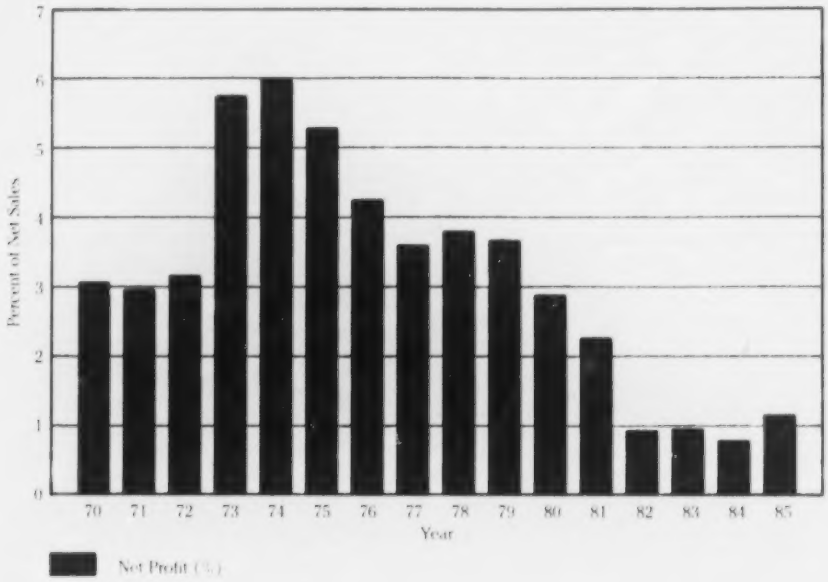
Type Firm	Change in Real Sales	Net Change in Number of Firms (No.)	(%)
Building materials	-46%	-170	-14%
Auto dealers	-33	-214	-19
Hardware	-30	-104	-11

In most small towns there appears to be a critical mass of businesses required for retail stability. Farm-related stores are a part of this critical mass and when they fail, often the equilibrium is upset and the critical mass begins to disintegrate with the consequent loss of other types of stores. Table 5 illustrates the magnitude of that phenomenon in Iowa.

Table 5. Changes in Basic Small Town Businesses in Iowa, 1979–85

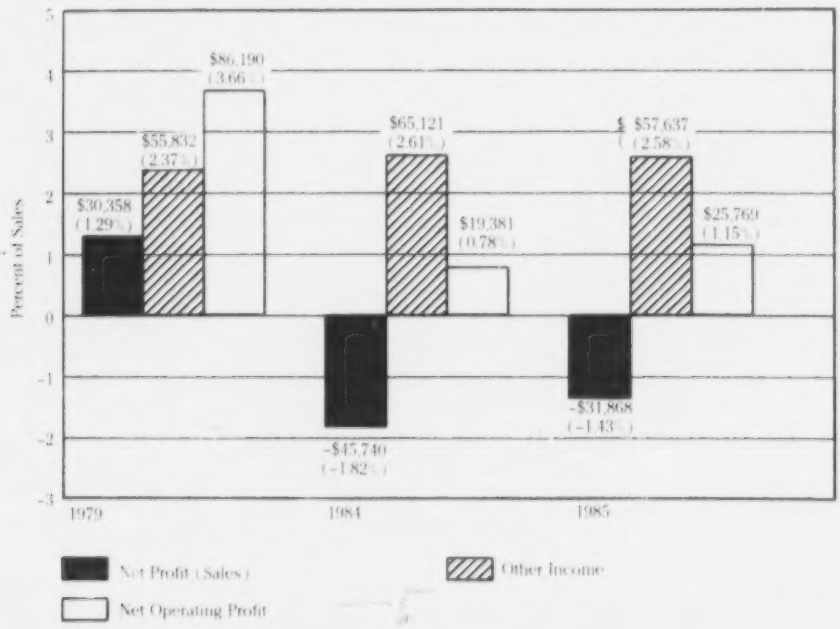
Type Firm	1979–85 Net Change in Number of Firms (No.)	(%)
Gas stations	-1,251	-30%
Grocery stores	-328	-18
Variety stores	-98	-23
Men's and boys' apparel	-90	-29
Movie theaters	-55	-21

Figure 5. Average Net Operating Profit for U.S. Farm Equipment Dealers, 1970–85



Source: *Annual Cost of Doing Business Survey*, National Farm and Power Equipment Dealers Association

Figure 6. U.S. Farm Equipment Dealers Change in Net Operating Profit, 1979–84



Source: *Cost of Doing Business Studies*, National Farm and Power Equipment Dealers Association

Field surveys indicate that the majority of those losses are occurring in towns below 5,000 population. However, Iowa Department of Revenue data indicate that the *total* number of firms continues to increase each year, even in smaller towns. It appears that new smaller firms, especially home-based businesses are being formed at a faster rate than existing businesses are failing. Table 6 gives examples of formation rates of typical home-based businesses.

Table 6. Formation Rate for Iowa Small Businesses, 1979–85

Type Business	1979–85 Change in Number of Firms (No.)	(%)	1979–85 Change in Real Sales Per Firm
Hobby, toy, crafts	1,088	80%	-17%
Direct selling	452	30	-51
Used merchandise	330	20	-30
Beauty shops	729	18	-14

Consumer Psychology

Although the farm sector has experienced greatly reduced income in the 1980s, most states have experienced net increases in total personal income. Even in Iowa, total personal income has remained relatively stable since the late 1970s as indicated by Figure 7. However, real retail sales in Iowa have decreased by 18 percent from 1979 to 1985 as shown in Figure 8. It is difficult to explain the gap between income and spending. Anecdotal evidence from merchants indicates that when the farm financial crisis started receiving dominant media coverage, widespread anxiety set in among consumers and many of them postponed nonessential purchases. That is a normal coping mechanism in times of uncertainty, but in Iowa, a very agriculturally dependent state, there seemed to be no end to the bad news; thus, the 18 percent gap between real personal income and real retail sales between 1979 and 1985. However, reports from major retailers and increased sales tax collections in 1986 indicate that a mild recovery is currently in progress in Iowa.

The Future

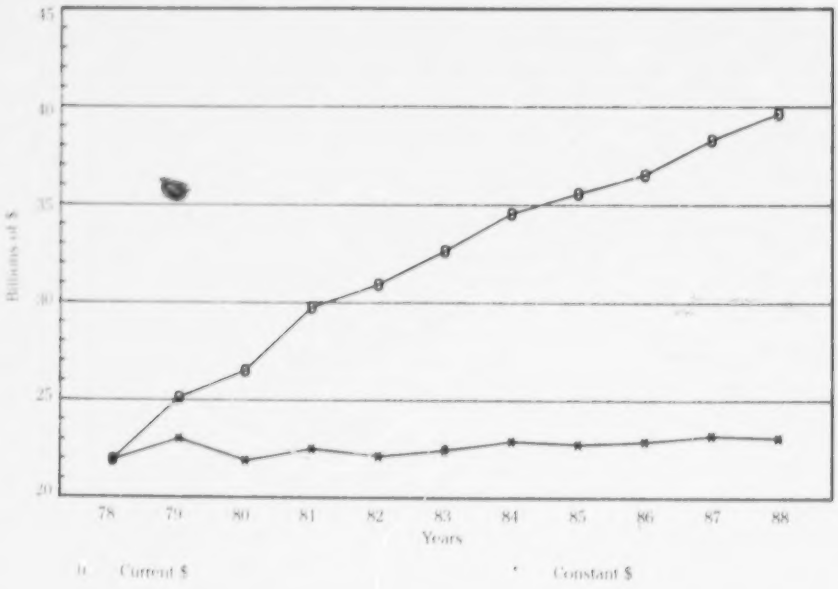
The future of rural communities depends on their ability to develop new and diversified economic bases. Historical evidence strongly suggests that the number of commercial farms will continue to decrease for many years to come, thereby debilitating the traditional economic base of most rural communities. The question is: will it be possible for rural communities to "reindustrialize," or are they destined to die slow, agonizing deaths?

Many people (usually city residents) argue that small towns have outlived their usefulness and should be allowed to "die." However, before policy makers reach that conclusion, the value of the assets of those towns should be closely examined. The investment in infrastructure such as highways, water systems, sewage systems, housing, and so forth is huge and probably should not be abandoned. Despite what governments decide to do or not to do for rural communities, leaders in some small towns will take actions to ensure the viability of their towns. The following are some of the actions that progressive leaders in small towns are taking.

- Regional cooperation to bring new industry into regional centers.
- Formation of local development corporations to purchase vacant buildings, renovate them, and put them back into use.
- Converting vacant buildings into "incubators" for new businesses.
- Active recruiting of successful business people in larger towns to establish "branch stores" in small towns.
- Seeking out firms to establish agricultural processing plants to add value to agricultural commodities (livestock and poultry processing, corn sweetener plants, cereal manufacturers, and so forth).
- Formulation of cooperatives to restore local stores and services.
- Encouragement of "home grown" industries through equity financing.

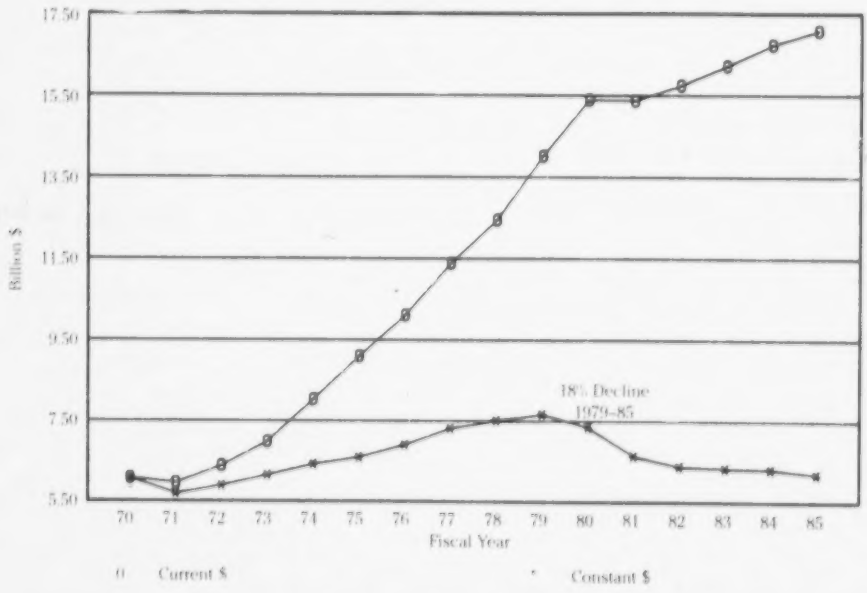
Ultimately, people will continue to live in rural communities as long as they are within reasonable commuting distance of jobs, shopping, and services. Unfortunately, many people have the mindset that jobs, shopping, and services cannot exist outside large cities.

Figure 7. Iowa Personal Income



Source: Department of Economic Development (Iowa)

Figure 8. State of Iowa Retail Sales, 1970–85



Source: *Iowa Retail Sales and Use Tax Reports*

However, if indeed we are entering the information age, why would it not be possible to decentralize data processing jobs to small towns where labor rates and overhead costs are lower? With electronic mail order becoming more refined, could not small town residents make many of their purchases directly from the comfort of their homes rather than traveling many miles to large, crowded shopping centers? With satellite television transmissions, would it not be possible in the near future for small town residents to enjoy a full range of cultural and educational activities without leaving home? Before writing off rural communities, those possibilities should be given careful consideration. In the end, technology may be the salvation of rural communities, which seems only fair since it is technology that has devastated them.

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Farm Debt and Farm Policy Linkages to the Agribusiness Sector and the Financial Condition of Agribusiness Firms

Roger G. Ginder

The term agribusiness firms is used to describe a heterogeneous collection of business enterprises that provide a wide variety of goods and services to farms and ranches producing agricultural products. The term is broad enough to include firms engaged in activities as diverse as milk processing, phosphate mining, grain alcohol production, chemical manufacturing, fertilizer retailing, or trucking. In size agribusiness firms range from small, individually owned retail petroleum operations with less than a million dollars of annual sales to huge multinational chemical corporations with annual sales measured in billions of dollars.

For the purposes of this paper, the term will be used to describe firms that do business directly with producers at the local level. The limitation in scope will highlight the effects on the smaller, less diversified agribusiness firms. As a rule, those firms are well integrated into rural communities and have important relationships to the economic and social structure in those communities. That is not to imply that the effects on more diversified national and multinational corporations are either absent or unimportant. It is, instead, an attempt to keep the focus of the paper on rural communities.

Four Major Divisions of Agribusiness Firm Activity

Agribusiness firm activity at the local level may be divided into four major categories, based on the type of business conducted. They are provision of capital goods and services with useful lives of more than one year; provision of consumable goods and services that are used up during a one-year production period; provision of commodity marketing, processing, storage, and handling services for farm products produced; and provision of input and commodity transportation services. Examples of agribusiness firms in each of the categories are shown in Figure 1. Although the list is not complete, it provides some perspective on the importance of farm income and expenditures in the rural economy.

Economic health and financial viability within all four categories of agribusiness firms are directly affected by production agriculture. The linkages to each category are somewhat different, and the strength of effects, both positive and negative, vary somewhat. Other policies such as monetary and fiscal policy are also important determinants of agribusiness firm health but will not be discussed in detail.

Key Linkages Between Categories of Agribusiness Firms and Production Agriculture

Eight major factors linking production agriculture to agribusiness firms are shown in Figure 2. The factors do not all relate to debt. Some relate to the problem of developing government farm policy in a era of worldwide overproduction as well. Harl has noted that production agriculture is confronted by two crises—a short-run (three to five year) debt crisis and long-term farm policy problems due to overproduction and excess capacity (Harl 1986a, 1986b, 1986c). Agribusiness firms are in a similar position.

Roger G. Ginder is a professor and extension economist in the Economics Department at Iowa State University.

Figure 1. Four Categorical Divisions of Agribusiness Firm Activity at the Local Level

Agribusiness Categories	Examples of Firms in the Category
Category I Capital Goods and Services Generally, firms providing items that have useful lives of more than one year	1. Farm implement dealers 2. Auto and truck dealers 3. Livestock and dairy equipment retailers 4. Livestock building and silo contractors 5. Lumber and building materials dealers 6. Plumbers 7. Electricians 8. Ready-mix concrete and paving firms 9. Earth-moving and trenching firms 10. Prefabricated machine sheds and farm building retailers 11. Grain storage bin dealers and contractors 12. Tiling and drainage firms
Category II Consumable Goods and Services Generally, firms providing items that are totally consumed during a one-year production period	1. Fertilizer, lime and chemical dealers 2. Feed dealers 3. Petroleum retailers 4. Hardware and parts retailers 5. Veterinarians 6. Crop advisory services 7. Aerial and ground application services 8. Farm accounting and record keeping services 9. Animal health and veterinary suppliers 10. Seed production, processing, and retailing
Category III Commodity Marketing, Processing, Storage and Handling Services Generally, firms that are dependent upon the volume of final output as raw products	1. Grain elevators 2. Grain merchandisers and brokers 3. Cotton gins 4. Cotton oil processors 5. Livestock auctions 6. Livestock slaughter plants 7. Soy processors 8. Corn processors 9. Feed manufacturers 10. Dairy processing plants
Category IV Input and Commodity Transportation Services Generally, firms that move raw products but usually do not take title	1. Livestock trucking firms 2. Milk haulers 3. Petroleum haulers 4. Railroads 5. Grain trucking

Figure 2. Important Linkages Between Agribusiness Firms and Production Agriculture

Debt Related Linkages
- Accounts receivable and trade credit
- Third party security interests in farm products
- Shared credit institutions with production agriculture
- Farm asset values

Farm Policy Related Linkage
- Volume of commodity production
- Farm production and conservation practices
- Farm commodity programs
- Gross and net farm income policy

The farm debt situation will cause problems for agribusiness firms over the short run (three to five years). Volumes of production and policies relating to production agriculture and exports will also affect the financial viability of the agribusiness sector over the long run. Plant, equipment, and a skilled work force are now in place to handle greater volumes of product than were handled at the height of the production and export boom.

Debt Related Linkages

Debt related farm stress has been well documented. In a survey conducted in early

1986, Jolly documented the fact that approximately 31 percent of Iowa farmers have a cash flow-to-equity ratio of less than -5 percent (Jolly and Olson). Stated differently, equity for that group based on actual net cash flow (including farm net income and income from outside sources) is eroding at a rate greater than 5 percent annually. For approximately 13 percent of that group, equity is being eroded at an annual rate greater than 20 percent. The erosion is occurring in addition to reductions in equity due to declines in asset value.

There are four major linkages between the agribusiness sector and the farm production level stress cited above. Those are through accounts receivable, the effect of declining farm asset values, the effects that arise from shared credit institutions with production agriculture, and the effect of the Uniform Commercial Code (UCC) third party security interests. Accounts receivable losses most seriously affect agribusiness firms in category I and category II—those providing capital goods and services and those providing consumable goods and services. Firms providing storage, marketing, processing, and handling services tend to be less affected by farm insolvency or bankruptcy. Likewise, firms involved in farm input and commodity transportation tend to be insulated from losses due to farm insolvency.

The reverse situation exists with the UCC Article 9 third party security interests. Third party security interests have relatively little direct effect upon the agribusiness firms providing capital goods and services or the category providing consumable goods and services. Although those firms can and sometimes do take a security interest in crops and livestock and can initiate action under the Article 9 provisions of the UCC, such third party provisions are rarely used by agribusiness firms. Prior perfected security interests in farm products are usually held by primary lenders. Financing agreements with primary lenders usually contain after-acquired property clauses covering future production. That situation usually leaves the agribusiness firms in a second priority class with respect to farm product collateral.

Figure 3. Strength of Relationships Between Farm Debt Stress Factors and Agribusiness Firms

	Linkage with Farm Debt Problem			
Agribusiness Firm Category	**Accounts Receivable**	**UCC Third Party Security Interest Provisions**	**Shared Credit Institutions**	**Farm Asset Values**
Category I Capital Goods and Service Retailers	Strong Relationship	Little or No Relationship	Moderately Strong Relationship Through Local Banks	Very Strong Relationship
Category II Consumable Goods and Services	Strong Relationship	Little or No Relationship	Relatively Strong Relationship Through Farm Credit System and Local Banks	Moderately Strong Relationship
Category III Commodity Marketing, Processing, Storage, and Handling Services	Weak Relationship	Strong Relationship	Relatively Strong Relationship Through Farm Credit System and Local Banks	Relatively Weak Relationship
Category IV Transportation Services	Not Closely Related	Related Only When Title to Commodity is Taken	Not Closely Related Except for Local Trucking	Not Closely Related

Firms involved in commodity marketing, processing, storage, and handling are, however, exposed to losses under that provision of the UCC. Under current UCC provisions (where they have not been altered by state law), those firms are forced to conduct elaborate lien searches and issue two-party checks for payment. If that is not done, the risk of so-called "double jeopardy" exists under Article 9 provisions of the UCC; lenders may force firms to pay twice for products purchased directly from farmers (Harl 1986a). The low gross and net margins in the industry make such incidents potentially ruinous to agribusiness firms.

Changes in the law at the federal level were scheduled to take effect in December 1986. The provisions will shift some of the burden for notification from purchasers of farm products to the holders of the security interests. However, in states where the statute of limitations has not been shortened, a five-year "tail" of potential liability for double payment dating back to 1981 exists. Firms involved in transportation services as a rule do not take title to commodities and, thus, are not affected by the UCC provisions.

Shared credit institutions represent a farm debt related problem for many local agribusiness firms. Lenders heavily involved in providing loans to the agricultural production sector are also frequently the primary credit source for agribusiness firms based in the local community. That situation exposes the agribusiness firms to risks of Federal Deposit Insurance Corporation (FDIC) liquidation in the event the lenders become insolvent. Locating a new lender in those situations can be difficult for some agribusiness firms. In the current economic climate, few credit institutions wish to expand agricultural loans in the portfolio unless the potential agribusiness firm is in extremely sound condition.

A more subtle (and perhaps more serious) effect on agribusiness firms arising from the use of common lenders with the agricultural production sector is the cost of credit. Large losses experienced by lending institutions in rural areas have increased operating costs for those lenders. Uncollectible loans and higher reserves for bad loans in those institutions have delayed the downward adjustment in interest rates to their borrowers.

As a consequence, locally based agribusiness firms using such lenders must bear part of the cost of the debt stress in agriculture. That added cost affects agribusiness firms in all four categories. To the extent that agribusiness firms are dependent upon financing from lenders with heavy losses from a portfolio of farm and ranch loans, they bear part of the cost of those losses in the form of higher rates and less favorable terms. Smaller, locally owned firms that handle capital goods or consumable inputs or are engaged in commodity storage and marketing are most likely to be affected because they depend more heavily on local rural lenders. Larger, more diversified firms have better access to the capital markets of the general economy.

However, the problem is not limited to borrowers from local banks. A majority of the local cooperatives in the Corn Belt and Plains States get seasonal and long-term financing through the Banks for Cooperatives. Banks for Cooperatives, as part of the Farm Credit System, have entered into elaborate system-wide loss-sharing agreements. Federal Intermediate Credit Bank (FICB) and Federal Land Bank (FLB) losses occurring in the larger district farm credit banks have been high. Those losses have occurred in the largest of the district banks that, as a group, account for the majority of system-wide loan volume.

Interest rates to local cooperatives in category II and category III have been affected by the change. Although the Banks for Cooperatives operate under a separate charter from the FICB and the FLB, the banks are often under common management. In those cases where financial assistance has been requested, FCA has taken a more active role in setting rates. In those situations, reductions in interest rates charged by the Banks for Cooperatives have lagged interest rate reductions in the general economy, leaving local cooperatives in some districts at an interest cost disadvantage of up to three percentage points, compared with large corporate competitors.

Unlike other banks in the Farm Credit System, the Banks for Cooperatives require borrowers to purchase stock based on their five-year loan volume under a base capital plan. Under that plan, capital is revolved out

over a five-year period once a loan has been terminated with the bank. Local cooperatives that elect to seek other lenders must wait five years to have capital completely revolved out. Thus, the cooperative must pay the higher rates or sustain the opportunity cost of capital during the five-year period.

The reductions in farm asset values affect agribusiness firms. It is arguable whether reductions in farm asset values have occurred in response to the debt situation or expectations for future commodity prices and government support programs. However, farm asset value reductions have occurred during a period of relatively heavy expenditures in government support programs. That, coupled with the fact that total and partial liquidations of farms have been occurring at an accelerated rate during the period, indicates that the problem may be debt related.

Reductions in asset value have most seriously affected category I agribusiness firms—those supplying capital goods and services. Firms providing land improvement services, buildings, and crop production implements have all suffered a reduction in demand. Falling asset values result in rapid declines in rural wealth. Even in cases where sufficient cash exists to purchase durable assets, the psychological effects and perceptions created by declines in producers' net worth tend to dampen demand. Added to the problem is a greater availability of high quality used capital goods resulting from total and partial liquidation of existing farms.

Category II agribusiness firms are somewhat affected by farm asset values but not as much as capital goods firms. The effects appear mostly through problems their farm customers have in getting bank credit for purchase of consumable inputs. When production credit is curtailed, the producer becomes more dependent upon dealer credit (trade accounts) and other types of outside financing.

Category III and IV firms are not greatly affected by declining asset values. Those firms are affected only when volume of production is reduced; there is little evidence that falling asset values have reduced the volume of production.

Farm Policy Related Linkages

Debt related problems are an important force affecting the financial condition of agribusiness firms. However, farm policy effects may have been an equally important determinant of current agribusiness financial condition. Key linkages between agribusiness firms and farm policy factors are shown in Figure 2. The general effects of those linkages on the four categories of agribusiness firms are shown in Figure 4.

U.S. farm policies affect the volume of commodity production, depending upon the objective of the program. Policies that require large set asides or similar production controls to enhance market price reduce volume of production and the volume of agribusiness activity. At the other end of the spectrum, policies that encourage production at relatively high target prices with subsidies to make up the difference between market and target prices tend to increase volume of production and agribusiness sales.

Category I firms are not seriously affected by such policies in the very short run. However, over a period of several years, policies that discourage production reduce the demand for capital goods and services. That is particularly true for those capital items directly involved in the production of the commodity in question.

Category II, III, and IV agribusiness firms are more seriously affected by the volume of production. Existing capacity in those firms quickly becomes excess when production is reduced. Ensuing reductions in prices and gross margins due to the competitive nature of those industries cause widespread operating losses. Firms with relatively high leverage and a high undepreciated basis in assets are seriously affected (Ginder).

Farm production practices and conservation policies affect the financial position of firms in all categories. Such policies affect some regions more than others. For example, long-term conservation reserve programs and the so-called "sod buster" or "swamp buster" programs have the potential to cause problems for firms in marginal production areas. Effects on agribusiness in those areas are likely to be out of proportion to the expected effects over the industry as a whole. Shifts in land use that occurred in the ten-

Figure 4. Strength of Relationships Between Farm Policy Factors and Financial Position of Agribusiness Firms

	Linkage with Farm Policy Variable			
Agribusiness Firm Category	**Volume of Commodity Production**	**Farm Production and Conservation Practices**	**Farm Commodity Program Support Mechanisms**	**Gross and Net Farm Income Level**
Category I Capital Goods and Service Retailers	Somewhat Related (Over Several Years)	Strongly Related in Areas Where Participation Is High	Somewhat Related Over Several Years	Strongly Related
Category II Consumable Goods and Services	Strong Relationship	Strongly Related in Locations Where Participation Is High	Strongly Related	Not Closely Related*
Category III Commodity Marketing, Processing, Storage, and Handling Services	Strong Relationship	Strongly Related in Locations Where Participation Is High	Strong Relationship	Not Closely Related
Category IV Transportation Services	Strong Relationship	Strongly Related in Locations Where Participation Is High	Strong Relationship	Not Closely Related

*The author acknowledges that when past data are used to generate coefficients there may be a correlation between purchase of consumable goods and services. Some econometric studies have produced positive coefficents that are statistically significant. However, equally high levels of farm income might be expected to generate negative coefficients if the price support mechanisms had been severe supply and acreage reduction rather than per unit production subsidies.

year period 1973–82 encouraged rapid growth in marginal areas for crop related agribusiness acitivity and reductions in livestock related agribusiness activity. Reversal of such shifts can be expected to put severe volume pressure on agribusiness firms in those areas.

Farm commodity support mechanisms are also important. Use of Payment in Kind (PIK), Payment in Commodities (PIC), or marketing loans that encourage movement of commodities into market channels are more favorable to category III agribusiness firms. Commodity programs that employ severe acreage or marketing restrictions to raise prices and incomes leave excess capacity in the agribusiness sector and affect all categories of firms adversely.

Finally, the targeted level of farm income has a direct linkage with financial conditions in some types of agribusiness firms. Higher levels of farm income generally create more favorable demand conditions for category I firms supplying capital goods and services. However, recent changes in the tax laws may dampen the incentive to use some types of capital expenditures as income tax shelters. In particular, repeal of investment tax credit and alterations in treatment of land improvement expenses could make a difference in the strength of the positive income effects enjoyed by category I firms.

Effects on category II, III, and IV firms are much less direct. There may be some increased demand for category II services and somewhat greater willingness on the part of producers to apply those fertilizers with carry-over effects, but in most cases the effects of higher income on consumables is not great. Clearly, volume effects more

directly affect those firms than income. Where the mechanism used to increase farm income does not reduce volume, the higher income will be helpful. But where volume is severely reduced, the positive effects on income are lost.

Changes in Financial Condition of Cooperatives in Sixth and Eighth Farm Credit Districts

The second portion of this paper will focus on six years of financial data collected from firms in the Sixth Farm Credit District (Illinois, Missouri, and Arkansas) and on data collected from the Eighth Farm Credit District (Iowa, Nebraska, South Dakota, and Wyoming). Firms in the sample represent approximately 50 percent of the population of grain marketing and farm supply cooperatives in each district. Financial condition as reflected in assets, debt, equity, and working capital were examined over a five-year period. Operating performance related to financial condition as reflected by sales, profits, net cash flow, and bad debt expense are also included.

The firms in the sample are indicative of firms described in categories II and III. For data on firms in category I, see Stone. No data was collected on transportation firms in category IV.

Average levels of assets and debt are shown in Table 1 for cooperatives in the Sixth Farm Credit District and the Eighth Farm Credit District for the six-year period 1980–85. Assets are divided into local assets (net of investment in regional cooperatives) and total assets. Debt is separated into current (due in less than twelve months) and long term (due beyond twelve months). Average debt-to-asset ratio is also shown for each district. Debt-to-asset ratio for firms in the sixth district declined steadily over the six-year period from .57 in 1980 to .45 in 1985. A similar but smaller reduction occurred in the eighth district where the average ratio fell from .57 in 1980 to .51 in 1985.

Data in Table 2 show the average sales and the percent of total sales in Sixth and Eighth Farm Credit District cooperatives over the period 1980–85. The data indicate that a greater portion of the sales in each district are being made by firms in lower debt-to-asset categories. In 1980, firms in the .7 or more debt-to-asset category accounted for 24 and 29 percent of total sales for the sixth district and eighth district, respectively. By 1985, firms in the .7 or more debt-to-asset ratio accounted for 12 percent of total sales in the sixth district and 22 percent in the eighth district.

Data indicate that average sales per firm in the high leverage category (debt-to-asset ratio of more than 70 percent was generally

Table 1. Average Assets Per Firm and Average Debt Per Firm for District 6 and District 8, 1980–85

Year	Local Assets ($000)	Total Assets ($000)	Current Debt ($000)	Long-term Debt $(000)	Debt-to-Asset Ratio
			District 6		
1980	2,716	3,319	1,331	356	.57
1981	2,678	3,357	1,212	396	.54
1982	2,512	3,225	1,019	369	.51
1983	2,508	3,221	935	336	.47
1984	2,491	3,201	942	329	.47
1985	2,383	3,105	827	318	.45
			District 8		
1980	2,823	3,446	1,242	539	.57
1981	2,839	3,567	1,189	578	.56
1982	2,727	3,470	1,019	589	.54
1983	2,818	3,598	1,108	580	.54
1984	2,850	3,660	1,168	532	.53
1985	2,685	3,486	993	521	.51

Table 2. Average Sales and Percent of Total Sales for District 6 and District 8 by Debt-to-Asset Category, 1980–85

Year	N	%*	.11–.4 ($000)	N	%	.41–.7 ($000)	N	%	.7+ ($000)	N	%	All Firms ($000)
						District 6						
1980	40	16	8,894	130	60	10,641	43	24	12,697	213	100	10,728
1981	52	20	9,121	116	55	11,194	46	25	12,972	214	100	11,072
1982	70	29	9,648	108	54	11,894	35	17	11,659	213	100	11,117
1983	87	37	9,757	99	49	11,239	26	14	11,983	212	100	10,722
1984	85	35	9,325	100	50	11,153	30	15	11,564	215	100	10,487
1985	93	43	9,727	87	45	10,761	25	12	10,454	205	100	10,254
						District 8						
1980	39	9	5,336	145	62	9,796	52	29	12,867	236	100	9,736
1981	49	12	6,372	140	61	11,668	49	27	14,639	238	100	11,189
1982	56	16	5,823	135	60	9,332	41	24	12,347	232	100	9,018
1983	64	21	6,752	122	52	8,941	47	27	12,086	233	100	8,974
1984	65	18	7,340	129	59	12,348	42	23	14,715	236	100	11,390
1985	86	28	6,669	95	50	10,533	39	22	11,377	220	100	9,172

*Percentage refers to percent of total sales in all sample firms in that district.

higher than the district-wide average sales per firm in all five years. The pattern held in both districts. However, average sales in the eighth district .7 or more debt-to-asset ratio category exceeded the average for all firms by a wider margin than was observed in the sixth district.

A similar pattern was found for total assets. Data in Table 3 show a decline in the percent of each district's total assets held by firms in the greater than .7 debt-to-asset category. In 1980, 72 percent of the assets in the district were held by firms with debt-to-asset ratios of less than .7. By 1985, 87 percent of the district's assets were in the hands of firms with debt-to-asset ratios of less than .7. Data for the Eighth Farm Credit District show 68 percent of the assets held by firms in lower leverage categories in 1980 and 80 percent held by firms in the lower leverage categories by 1985.

The average firm size (as measured by assets) in the greater than .7 debt-to-asset category exceeded the average for all firms for each of the five years. Although the number of firms and the proportion of the

Table 3. Average Total Assets and Percent of Total Assets for District 6 and District 8 by Debt-to-Asset Category, 1980–85

Year	N	%*	.11–.4 ($000)	N	%	.41–.7 ($000)	N	%	.7+ ($000)	N	%	All Firms ($000)
						District 6						
1980	40	12	2,053	130	60	3,273	43	28	4,633	213	100	3,319
1981	52	15	2,077	116	55	3,413	46	30	4,665	214	100	3,357
1982	70	27	2,608	108	53	3,379	35	20	3,982	213	100	3,225
1983	87	34	2,663	99	51	3,498	26	15	4,031	212	100	3,221
1984	85	31	2,521	100	53	3,664	30	16	3,583	215	100	3,201
1985	93	42	2,849	87	45	3,291	25	13	3,410	205	100	3,105
						District 8						
1980	39	8	1,698	145	60	3,374	52	32	4,955	236	100	3,446
1981	49	11	1,913	140	60	3,615	49	29	5,084	238	100	3,567
1982	56	15	2,184	135	61	3,630	41	24	4,702	232	100	3,470
1983	64	20	2,651	122	54	3,698	47	26	4,627	233	100	3,598
1984	65	18	2,381	129	58	3,907	42	24	4,878	236	100	3,660
1985	86	29	2,579	95	51	4,086	39	20	4,023	220	100	3,486

*Percentage refers to percent of total assets in all sample firms in that district.

district's total assets held by firms in the greater than .7 debt-to-asset category were declining over the five-year period, the average dollar value of assets per firm in the greater than .7 category exceed the average dollar value of all firms each year.

It would be expected that the proportion of the total equity in firms with a debt-to-asset ratio less than .7 would increase over the period. The fact that a higher portion of each district's total assets were held by firms in debt-to-asset categories less than .7 in 1985 implies that the equity claims against those assets would also be higher in 1985. The data are shown in Table 4. The 1980 fiscal year-end close in the sixth district showed 80 percent of the district's total equity was held by firms with debt-to-asset ratios less than .7. By the fiscal year close 1985, 92 percent of the sixth district's equity was held by firms with less than a .7 debt-to-asset ratio. In 1980, about 77 percent of the eighth district's total equity was held by firms with debt-to-asset ratios less than .7. By 1985, 89 percent of the total equity was held by firms with debt-to-asset ratios less than .7.

Average dollar equity per firm also declined for the high leverage category. In 1980, the average dollar equity per firm in the .7 or greater debt-to-asset category exceeded the average for all firms. That was true in both districts. By 1982, the average for firms in the .7 or greater category had fallen below the district-wide average equity for all firms. That condition occurred in both districts and had not changed by 1985. It is difficult to identify specific reasons why the average equity per firm fell in relation to average equity for all firms. Migration of firms to and from the .7 or greater debt-to-asset category occurred over the period. In addition, the dynamic effects of operating losses over a period undoubtedly had some effect.

Average long-term debt and the percent of total long-term debt for the firms in the Sixth and Eighth Farm Credit Districts are shown in Table 5. The average debt in all categories in both districts increased between 1980 and 1985. Increases in average debt were most pronounced in the .7 or greater debt-to-asset category where the average increased by $109,000 and $171,000 for the sixth and eighth districts, respectively. The average dollar value of debt in the .7 or greater category was much larger in the eighth district, however. During the period, there was a migration by a portion of the sample firms into and out of the .7 or greater debt-to-asset category in both districts. That migration may be partially responsible for year to year changes in the averages.

The distribution of debt among all debt-to-asset categories changed somewhat over the period. In both the sixth and eighth districts, there was a decline in the portion of debt held by firms in the .41 to .7 debt-to-asset category and a three-fold increase in the portion of the debt held by firms in the 11 to

Table 4. Average Equity and the Percent of Total Equity for District 6 and District 8 by Debt-to-Asset Category, 1980–85

Year	N	%*	.11–.4 ($000)	N	%	.41–.7 ($000)	N	%	.7+ ($000)	N	%	All Firms ($000)
						District 6						
1980	40	17	1,475	130	63	1,709	43	20	1,667	213	100	1,657
1981	52	21	1,537	116	57	1,872	46	22	1,790	214	100	1,773
1982	70	34	1,936	108	51	1,892	35	15	1,644	213	100	1,866
1983	87	42	2,030	99	47	1,981	26	11	1,708	212	100	1,968
1984	85	40	1,981	100	50	2,101	30	10	1,424	215	100	1,959
1985	93	51	2,238	87	41	1,910	25	8	1,424	205	100	1,999
						District 8						
1980	39	12	1,251	145	65	1,793	52	23	1,722	236	100	1,688
1981	49	16	1,414	140	64	1,990	49	20	1,741	238	100	1,820
1982	56	21	1,642	135	64	2,057	41	15	1,634	232	100	1,882
1983	64	28	1,974	122	55	2,041	47	17	1,646	233	100	1,943
1984	65	25	1,841	129	60	2,200	42	15	1,640	236	100	2,002
1985	86	39	2,000	95	50	2,331	39	11	1,338	220	100	2,026

*Percentage refers to percent of total equity.

Table 5. Average Long-Term Debt for District 6 and District 8 by Debt-to-Asset Category 1980–85

Year	N	%*	.11–.4 ($000)	N	%	.41–.7 ($000)	N	%	.7+ ($000)	N	%	All Firms ($000)
						District 6						
1980	32	8	174	123	62	356	42	30	496	197	100	356
1981	44	10	182	112	55	389	45	35	623	201	100	396
1982	57	16	202	104	59	407	35	25	530	196	100	369
1983	78	22	189	96	57	399	26	21	543	200	100	336
1984	71	17	152	95	59	401	29	24	526	195	100	329
1985	71	23	181	86	54	359	22	23	605	179	100	318
						District 8						
1980	30	4	144	143	60	505	52	36	861	225	100	539
1981	41	5	176	139	59	561	49	36	963	229	100	578
1982	50	8	198	133	59	586	41	33	1,074	224	100	589
1983	55	11	256	118	55	597	46	34	925	219	100	580
1984	52	10	233	123	55	512	42	35	959	217	100	532
1985	69	15	227	91	48	537	39	37	1,032	197	100	521

*Percentage refers to percent of long-term debt falling in the debt-to-asset category.

40 percent category. The portion of debt in the .7 or greater category decreased slightly in the sixth district and remained relatively constant in the eighth district, despite the fact that the actual number of firms in the .7 or greater category in 1985 had fallen by about 50 percent in District 6 and about 30 percent in District 8. A substantial portion of the district-wide debt remained in the hands of firms with greater than 70 percent leverage.

Migration Among Debt-to-Asset Ratio Categories, 1980–85

Data in Table 6 show the movement of firms among debt-to-asset categories between 1980 and 1985 along with the number of sample firms that left the industry or lost their identity through merger. Firms not present in 1980 represent observations where a 1980 statement was not available.

The bottom row and the column on the far right show the total number of sample firms in each debt-to-asset category in 1980 and 1985, respectively. The numbers along the diagonal show the number of firms that were in the same debt-to-asset category in both years. Numbers above the diagonal represent firms in the 1980 debt-to-asset column that moved to a lower debt-to-asset category or firms that did not supply 1980 statements. Numbers below the diagonal represent the number of firms in the 1980 debt-to-asset column that moved to a higher debt-to-asset category or did not survive as an independent entity in 1985.

Migration of sample firms to lower debt-to-asset categories occurred more often than migration to higher debt-to-asset categories. Nearly half the District 6 firms in the .41 to .7 debt-to-asset category at their 1980 statements had moved down to the .11 to .4 debt-to-asset category by the 1985 closings. About 40 percent of the District 8 cooperatives had made such a move.

More than half the District 6 cooperatives in the .7 or greater debt-to-asset category at their 1980 fiscal year-end had moved to a lower category by the 1985 closing. Again, following the same pattern, about 40 percent of the Eighth Farm Credit District cooperatives moved from the .7 or greater debt-to-asset category to a lower debt-to-asset category. In part, those migrations represent a widespread attempt to reduce long-term debt. However, reductions in current liabilities associated with grain inventories were also a factor (see Table 1).

Operating Losses

Local operating losses (before patronage refunds from regional cooperatives) are shown in Table 7. Less than 10 percent of the firms in the .11 to .4 and the .41 to .7 debt-to-asset categories and less than 50 percent of the firms in the .7 or greater

Table 6. Migration Among Debt-to-Asset Categories for District 6 and District 8 Cooperatives Between 1980 and 1985

	From	1980					*Total Number of Firms 1985*
	To	<.11	.11–.4	.4–.7	>.7+	*Entered Sample*	
				District 6			
	<.105	0	6	2	0	NA	8
	.105–.405	1	29	58	5	0	93
	.405–.705	0	5	61	21	0	87
1985	>.705	0	0	8	16	1	25
	Left Industry or Merges	0	0	1	1	NA	2
	Total Number of Firms 1980	1	40	130	43	1	215

	From	1980					*Total Number of Firms 1985*
	To	<.11	.11–.4	.4–.7	>.7+	*Entered Sample*	
				District 8			
	<.105	0	3	2	0	NA	5
	.105–.405	0	28	54	2	2	86
	.405–.705	0	4	73	17	1	95
1985	>.705	0	0	9	28	2	39
	Left Industry or Merges	0	4	7	5	NA	16
	Total Number of Firms 1980	0	39	145	52	5	241

Table 7. Average Local Losses and Percentages of Firms with Local Losses for District 6 and District 8 by Debt-to-Asset Category, 1980–85

	.11–.4			.41–.7			.7 or more		
Year	**N**	**%***	**$**	**N**	**%**	**$**	**N**	**%**	**$**
				District 6					
1980	2	5	-12,500	10	8	-29,100	19	44	-105,105
1981	7	13	-20,571	33	29	-49,182	37	80	-202,656
1982	8	11	-27,375	28	26	-70,357	24	69	-168,750
1983	4	5	-24,750	25	25	-74,160	13	50	-220,000
1984	31	36	-70,710	53	53	-113,415	20	67	-244,600
1985	12	13	-58,083	46	53	-119,739	17	68	-135,882
				District 8					
1980	0	0	—	8	6	-37,092	19	37	-197,163
1981	3	6	-45,631	31	22	-72,460	30	61	-271,929
1982	4	7	-25,749	31	23	-53,221	34	83	-226,633
1983	5	8	-23,631	20	16	-83,146	32	68	-278,477
1984	11	17	-43,470	39	30	-63,676	31	74	-290,972
1985	23	27	-62,413	38	40	-138,748	29	74	-340,370

*Percentage refers to percent of firms in each debt-to-asset category sustaining operating losses.

category sustained operating losses in 1980. That was true in both the sixth and eighth districts.

A somewhat higher proportion of the eighth district firms in the .7 or greater debt-to-asset category sustained losses during the last four years of the period. Comparison between the two districts in the lower debt-to-asset categories show that was not the case for firms with less leverage. A higher percentage of sixth district firms in the .41 to .7 debt-to-asset category experienced operating losses during each year of the period. In the .11 to .4 debt-to-asset category, the fraction of the sixth district sample firms running losses exceeded the fraction of eighth district sample in four of six years.

The average dollar value of losses occurring in the .7 or greater debt-to-asset category for District 8 exceeded the comparable measure for District 6 throughout the period. In most years, the average operating loss for District 8 firms was $50,000 higher than that of District 6 firms.

The patterns shown here indicate that leverage alone does not explain the occurrence of operating losses in cooperatives in the two districts—particularly in 1984–85. It is true that a higher proportion of firms in the .7 or greater category sustained losses. High interest rates over the period were certainly a factor in those losses. However, an increasing number and percentage of firms in the .41 to .7 debt-to-asset category and in the .11 to .41 debt-to-asset category experienced an increase in the incidence of operating losses as well. Those losses cannot be totally attributed to the cost of borrowing. It is probable that debt stress and farm policy played a greater role in the 1984 and 1985 performance than interest cost and borrowing.

Net Cash Flow

The number of firms experiencing negative and positive net cash flow are shown by debt-to-asset category in Table 8. Negative net cash flow occurs when net earnings and depreciation are not sufficient to cover principal and interest. Large negative cash flows erode the firm's liquidity and ability to operate effectively.

The total number of firms not generating positive cash flow increased during the six-year period for both District 6 and District 8. By 1984 and 1985, both districts had approximately one-third of their firms generating negative cash flows. Data in Table 8 indicate that the majority of firms in the .7 or greater debt-to-asset category were generating negative cash flow for the five-year period after 1980. The number of firms in the .41 to .7 debt-to-asset category experiencing negative net cash flow for the five-year period after 1980. The number of

Table 8. Number of Firms with Positive NCF and Negative NCF for District 6 and District 8 by Debt-to-Asset Category, 1980–85

	.11–.4		.41–.7		.7 or more		All Firms	
Year	NCF>0	NCF<0	NCF>0	NCF<0	NCF>0	NCF<0	NCF>0	NCF<0
				District 6				
1980	32	1	118	7	30	11	180	19
1981	44	3	88	20	18	25	150	48
1982	56	2	87	17	15	16	158	35
1983	67	0	78	9	11	13	156	22
1984	44	16	63	29	11	16	118	61
1985	61	4	48	23	10	14	119	41
				District 8				
1980	39	0	135	10	34	18	208	28
1981	46	3	114	26	16	33	176	62
1982	52	4	107	28	9	32	168	64
1983	58	6	101	21	15	32	174	59
1984	58	7	89	40	12	30	159	77
1985	72	14	57	38	9	30	138	82

*Net cash flow set equal to zero when no long-term debt is reported.

firms in the .41 to .7 debt-to-asset category experiencing negative net cash flow also increased over the period. The largest cash flow deficits occurred in 1984 and 1985. In the sixth and eighth districts, nearly half the firms in the .41 to .7 debt-to-asset category sustained a negative cash flow during the 1984 and 1985 fiscal years.

Average dollar net cash flows shown in Table 9 indicate that the negative net cash flows sustained in District 8 were larger than those in District 6. Average dollar negative net cash flows for the .7 or more debt-to-asset category in District 8 exceeded the average in District 6 in all years but 1980. Average negative cash flow levels for all firms in District 8 were about equal to or larger than the comparable District 6 average for all years. After 1982, the negative cash flows in District 6 trended to smaller numbers while those in District 8 tended to get larger. The disparity indicates that, district-wide, the liquidity position in District 8 is under increasing pressure.

Table 9. Average Net Cash Flow by Debt-to-Asset Category for Firms with Positive NCF and Negative NCF, 1980–85

Year	.11–.4		.41–.7		.7 or more		All Firms	
	NCF>0 ($000)	NCF<0 ($000)	NCF>0 ($000)	NCF<0 ($000)	NCF>0 ($000)	NCF<0 ($000)	NCF>0 ($000)	NCF<0 ($000)
				District 6				
1980	231	-20	262	-110	211	-201	248	-158
1981	158	-9	205	-151	99	-111	179	-121
1982	238	-14	213	-218	119	-149	213	-175
1983	235	—	228	-49	258	-151	233	-109
1984	267	-64	181	-114	60	-143	202	-109
1985	224	-36	138	-91	168	-128	184	-98
				District 8				
1980	196	—	238	-140	218	-164	227	-155
1981	172	-54	217	-139	153	-216	199	-176
1982	182	-17	192	-130	98	-223	184	-170
1983	234	-42	222	-186	125	-274	218	-212
1984	173	-59	256	-126	157	-287	218	-183
1985	159	-79	226	-177	146	-399	186	-242

Table 10. Average Working Capital for District 6 and District 8 by Debt-to-Asset Category, 1980–85

Year	N	%*	.11–.4 ($000)	N	%	.41–.7 ($000)	N	%	.7+ ($000)	N	%	All Firms ($000)
						District 6						
1980	40	19	556	130	61	507	43	20	295	213	100	474
1981	52	24	556	116	54	595	46	22	389	214	100	542
1982	70	33	713	108	51	537	35	16	315	213	100	558
1983	87	41	765	99	47	597	26	12	269	212	100	625
1984	85	40	767	100	46	637	30	14	208	215	100	629
1985	93	45	835	87	43	514	25	12	194	205	100	621
						District 8						
1980	39	17	499	145	61	552	52	22	312	235	100	491
1981	49	21	531	140	59	544	49	20	255	238	100	482
1982	56	24	616	135	58	523	41	18	161	232	100	481
1983	64	28	690	122	52	504	47	20	125	233	100	479
1984	65	27	636	129	55	514	42	18	91	236	100	472
1985	86	39	604	95	43	451	39	18	48	220	100	439

*Percentage refers to percent of firms in the debt-to-asset category.

Working Capital

Average dollar working capital by debt-to-asset category for the Sixth and Eighth Farm Credit Districts are shown in Table 10. The average working capital for all firms has grown steadily in District 6 over the period. In contrast, the average working capital in District 8 has steadily eroded over the period.

Average working capital in firms with .7 debt-to-asset ratio has declined steadily since 1981 in District 6. However, the declines have not been steep. The comparable .7 or greater leverage category in District 8 declined steeply during the entire period from an average of $312,000 in 1981 to an average of $48,000 in 1985.

Working capital for firms in the .41 to .7 debt-to-asset category fluctuated over the six-year period but remained in the $400,000 to $600,000 range over the period in both districts. The lower leverage .11 to .4 group actually increased average working capital levels over the period. The relatively high fraction of that group with positive cash flows and the relatively low absolute levels of negative cash flow contributed to the growth in working capital in District 6. Average dollar net cash flows for the .7 or greater category in District 8 can be cited as a contributory factor in working capital declines. The .7 or greater category represents about 18 percent of the firms in the sample, and only about one-fourth of the firms in the category had positive cash flows in 1985. The steep declines in working capital in the eighth district .7 or greater category indicate that the resilience of the group has been eroded. Additional policy or accounts receivable shocks could put their survival in question.

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Issues and Implications of the Financial Stress in Agriculture: The State-Local Government Finance Dimension

David L. Chicoine

The financial stress being experienced by the farm economy has implications for the fiscal performance of the state-local government sector. Depending on the importance of farming to state and local economies and the structure of public finance and governmental service responsibilities, the economic stress on farms will adversely affect the performance of public revenue systems and the provision of a broad range of local government services. The purpose of this article is to provide evidence on the potential implications of the poorly performing farm economy for the fiscal condition of state-local governments and, consequently, the provision and financing of local government services in rural areas. Without national data, focus is on the state and local public finance systems in a group of farm-dependent states.

Public sector fiscal stress refers to unplanned sudden shortfalls in revenues that force a jurisdiction to cut expenditures or increase tax rates simply to maintain existing levels of service. Fiscal stress can follow economic stress, but it need not because tax bases or nontax revenues may not perfectly replicate the intertemporal movements of the economic base. Lags in the reassessment of real estate and the role of the state in financing local government services may limit or delay the impact of economic stress on the fiscal operations of local governments. Fiscal stress may also be experienced by a lower level of government because of changes in intergovernmental aid policies. In that context, several generalizations on the implications of the financial stress in agriculture for the state-local government sector can be identified:

- The dependence of rural local governments on property taxes for most of their own-source revenue will limit dramatic fluctuations in revenue and thus expenditures in the short run, because reassessment policies and practices delay the incorporation of economic conditions into property tax bases.
- Use-value farm land assessments may increase the exposure of rural local government budgets to fiscal instability, especially for governments dependent on a farm tax base, and if reassessments are frequent.
- In the longer term, decreases in property tax assessments will reduce the capacity of rural property tax bases and increase the fiscal stress on those rural local governments most dependent on that base. School districts, townships and county governments will be more directly impacted than municipalities and most special purpose governments (rural fire protection districts may be an exception).
- Lower revenue potential for rural local governments may negatively impact bond credit ratings increasing the difficulty and cost of financing public infrastructure. The poor profit position of rural banks, historically frequent buyers of smaller local tax exempt issues, will limit demand for bonds increasing the cost of borrowing. Small rural school districts may be most vulnerable.
- State governments, on the other hand, typically rely on revenues from tax bases (income and sales) that are quite responsive to changes in economic

David L. Chicoine is an associate professor and extension economist in agricultural economics and the Institute of Government and Public Affairs at the University of Illinois, Champaign-Urbana.

conditions exposing state budgets more quickly to stress from a poorly performing economy.

- The more centralized responsibilities are for community services and the more centralized is the state-local public finance system, the greater the exposure of communities and the service delivery system to revenue fluctuations of state governments.
- A weakened farm property tax base, reductions in state aid, and lower federal intergovernmental aid will not affect all local government services to the same extent. For example, education and roads are more reliant on state financial aid than police and fire protection.
- Because of structural safeguards, fiscal stress in a farm-dependent community does not automatically translate into fiscal crisis or an emergency for rural local governments. Fiscal implications depend on both the fiscal performance of state government and the structure of the state-local tax and expenditure systems.

Evidence From Farm-Dependent States

The nature of available secondary data makes the evaluation of the state-local government finance dimension of the financial crisis in American agriculture somewhat incomplete. However, several indicators of current or potential fiscal stress for farm-dependent state governments and their local governments suggest the level of fiscal stress has increased, and in the more farm-dependent states in the Midwest, conditions are developing that could lead to very serious challenges for state and local elected officials (Lawson; Hite and Ulbrich; and Stinson, et al.).

The implications of the restructuring of American farming for the state-local government sector will be most pronounced in states and communities where farming is an important basic economic activity and a major component of tax bases. Presented in Table 1 are the first quartile plus one (thirteen states) of states most dependent on farming from an income perspective and a geographical perspective. In total there are sixteen states, from among the thirteen states with the highest percent of personal income from farming in the late 1970s and/or from thirteen states with the largest percent of farm-dependent rural counties (Chicoine 1986c[1]). In those sixteen states there are 16,096 rural local governments serving more than six million rural residents. Governments include townships, counties, municipalities, school districts, and special purpose districts responsible for a broad range of local services.

The structure of local governance systems in an area or state adds complexity to identifying fiscal stress associated with the faltering farm economy. There is evidence that the structure of local governance systems impacts the performance of the local government sector, and different regions of the country have quite different systems of local government. For example, a study of fiscal conditions of counties would be quite useful in assessing fiscal stress in the rural South because of the dominant role of Southern county governments in local governance but somewhat less useful in the Midwest where other types of governments are important service providers (Chicoine and Walzer).

Revenue Structure of Farm-Dependent States

In general, farmers pay each of the major state and local taxes, but the property tax by far receives the most attention because of its visibility and importance in financing key local services like schools. The general approach to taxing the farm sector under the sales and the property tax in the sixteen farming-dependent states is outlined in Table 2. Except for South Dakota, the sixteen states have state income taxes. Most farm inputs are exempt from sales taxation. State and local sales tax revenues will be insulated from direct impacts of poor economic

[1]Dependence was measured over the 1975–79 period. The use of a more current time period would likely change the relative position of states, placing some states in the first quartile (plus one) that are now excluded and excluding some now included. Two strong candidates for possible inclusion would be Texas and Oklahoma. Both states had large energy sectors in the late 1970s. State government in both of those states are now fiscally stressed because of their dependence on energy-based taxes.

Table 1. First Quartile Plus One of Farm-Dependent States Based on Income and Farm-Dependent Rural Counties

Ranked by Income Dependence		Ranked by Proportion of Farm-Dependent Rural Counties	
Rank	*Percent Farm Income*[a]	*Rank*	*Percent FD Counties*[b]
1. North Dakota	11.56%	1. Nebraska	71.9%
2. South Dakota	10.60	2. South Dakota	68.9
3. Iowa	8.21	3. Iowa	60.0
4. Nebraska	7.69	4. Minnesota	50.0
5. Idaho	7.23	5. Montana	46.2
6. Arkansas	6.91	6. Arkansas	44.6
7. Mississippi	5.70	7. Kansas	41.2
8. Montana	5.27	8. North Dakota	40.6
9. Minnesota	4.99	9. Illinois	36.7
10. Kansas	4.92	10. Missouri	36.0
11. North Carolina	3.74	11. Idaho	35.6
12. Kentucky	3.62	12. Colorado	35.3
13. Wisconsin	3.43	13. Kentucky	34.3

[a]Weighted annual average percent personal income from farming, 1975 through 1979.

[b]Farm-dependent counties had a weighted annual average of 20 percent or more of personal income from farming, 1975 through 1979.

Sources: Calculated from Bureau of Economic Analysis, *Local Area Personal Income, 1973–78 and 1977–82*. Washington, D.C.: U.S. Department of Commerce, 1980 and 1984; and Bender, Loyd D., et al. *The Diverse Social and Economic Structure of Nonmetropolitan America*. Washington, D.C.: U.S. Department of Agriculture, September 1985.

Table 2. Summary of Agricultural Tax Policies for Farm-Dependent States

	Sales Tax Exemptions			Property Tax Policies		Food Sales Tax Exemption
	Equipment	Seed	Chemicals	Personality	Real Estate[b]	
Lake States						
Minnesota	P	E	E	E	Mkt	E
Wisconsin	E	E	E	E	CB	E
Corn Belt						
Illinois	E	E	E	NT	UUV	E
Iowa	E	E	E	P	UUV	E
Missouri	E	E	E	T	UUV	T
Northern Plains						
Kansas	E	E	E	P	UUV	T
Nebraska	E	E	E	E	UUV	E
North Dakota	E	E	P	NT	UUV	E
South Dakota	E	E	P	NT	Mkt	T
Appalachia						
Kentucky	E	E	E	P	VUV	E
North Carolina	T	E	E	P	VUV	T
Delta States						
Arkansas	E	E	E	T	UUV	T
Mississippi	P	E	E	E	UUV	T
Mountain States						
Colorado	T	E	E	E	UUV	E
Idaho	E	E	E	P	UUV	T
Montana	NT	NT	NT	P	UUV	NT

[a]E = exempt, P = partially exempt or taxed at reduced rate, T = taxed, NT = no tax.

[b]Mkt = market-based assessments, CB = market-based assessments with circuit breaker, UUV = universal use-value assessments, VUV = voluntary use-value assessments. Minnesota uses property classification and exemptions to provide property tax relief to farm land owners. Kansas is adopting UUV as part of a comprehensive property revaluation program to be completed in 1989.

Source: Chicoine, David L. "Farm Taxes" in *Reforming State Tax Policy*. Edited by Steven D. Gold. Denver: National Conference of State Legislatures, 1987.

conditions in farming. However, indirect impacts may be substantial (Ginder, Stone, and Otto). The sales tax is used by counties in Arkansas, Colorado, Illinois, Kansas, Missouri, and North Carolina, and it was recently authorized for Wisconsin counties. Municipalities in Arkansas, Colorado, Illinois, Kansas, Missouri, Nebraska, and South Dakota are also authorized to levy a local sales tax (ACIR).

Nine of the farm-dependent states have universal use-value farm land assessment programs and two have voluntary programs. Wisconsin, Minnesota, and South Dakota are the only states with market-based farm land assessments. There is some evidence that use-value assessment programs either increase or decrease the exposure of property tax bases to fiscal instability relative to market-based assessments, depending on reassessment policies (Ervin, Chicoine, and Nolte). The taxable value of farm real estate has declined in nominal terms in several states, but the change in farm assessments has not been as great as changes in market values of farm land (declines have been recorded in Illinois, Wisconsin, Iowa, and Nebraska) (Chicoine 1986b). That suggests that as the weakened conditions of the farm sector are captured by assessment systems, lower farm assessments can be expected in all states. Deteriorating market values for farm land and steady, if not increasing, property taxes (per acre) on farm land and in most farm-dependent states during the first half of the 1980s have led to significant increases in effective tax rates (the ratio of property taxes paid to market value of land) on farm real estate. For example, between 1981 and 1983 effective tax rates increased 18.2 percent in Illinois, 5.7 percent in Iowa, 39.5 percent in Minnesota, 12.5 percent in Missouri, and 14.5 percent in Wisconsin (Chicoine 1986b). Additional declines in market values without compensating decreases in property tax levies will continue to increase the effective property tax rates on farm real estate.

Some states have taken action to insulate local government property tax losses from the poorly performing farm economy. For example, legislation was passed in 1986 in Illinois to limit the decline in farm land assessments to 10 percent per year. The South Carolina legislature postponed adjustments in its use-value assessment formula in 1986 because the mandated adjustments resulted in negative assessments for 80 percent of the farm land in the state (Chicoine 1986a; Hite and Ulbrich). In addition, in the more farm-dependent areas, a poorly performing farm economy will exert downward pressure on nonagricultural real estate values and, upon reassessment, the nonagricultural property tax base of rural local governments. For example, Johnson reported substantial declines in nonagricultural real estate values in small Nebraska municipalities.

Table 3 compares the sources of revenue available to the state-local government sectors in the sixteen farm-dependent states. Those data do not provide direct evidence on fiscal conditions, but provide indications of exposure to changes in property assessments, income and sales tax bases, and federal aid. The more important the property tax is in financing state-local government services, the greater the potential for rural local government stress from a weakening property tax base, in the long run. The timing of the stress is dependent on individual state assessment policies. Conversely, more reliance on sales and income taxes will increase the possibility of unstable state-local government revenues, in the short run.

The importance of federal aid in the revenue structure of farm-dependent states suggests the loss in federal general revenue sharing and the reduction in other aid resulting from federal debt reduction policies will compound the adjustments in the public economies in those states. Most states are at or above the national average in federal aid dependence.

Another important factor in understanding the impact of the performance of the farm economy on state and local government finance is the degree of centralization in revenue responsibility and in service delivery. A decentralized tax system (where local taxes are a large percent of total state-local taxes) generally implies more property tax dependence. A decentralized spending system (where local spending is a large percent of state-local spending) implies local governments have relatively more service responsibilities.

Table 3. State-Local Revenue Structure of Farm-Dependent States

	Percent of Revenues, 1983–84.					
	Income Tax	General Sales Tax	Property Tax	Other Taxes	Charges, etc.	Federal Aid
Lake States						
Minnesota	21.5%	10.3%	15.9%	10.6%	25.9%	15.8%
Wisconsin	21.8	11.7	20.6	8.8	19.9	17.2
Corn Belt						
Illinois	13.7	14.1	23.0	12.0	18.5	18.7
Iowa	14.8	11.8	23.1	9.9	23.6	16.8
Missouri	14.0	19.8	13.6	11.4	22.3	18.9
Northern Plains						
Kansas	13.2	11.3	21.4	11.7	27.4	15.0
Nebraska	10.5	12.1	23.0	10.4	28.1	15.9
North Dakota	6.4	11.0	12.1	20.0	30.2	20.3
South Dakota	NT	13.3	18.5	11.4	33.8	23.0
Appalachia						
Kentucky	16.7	11.5	9.8	16.0	23.5	22.5
North Carolina	20.0	12.1	13.1	13.5	21.6	19.7
Delta States						
Arkansas	14.2	15.9	10.5	12.9	23.4	23.1
Mississippi	8.0	18.9	10.8	11.7	27.4	23.2
Mountain States						
Colorado	11.4	18.0	19.1	8.7	27.2	15.6
Idaho	14.3	13.7	14.5	21.7	15.2	20.6
Montana	9.6	NT	22.7	16.8	30.0	20.9
U.S.	15.0	13.9	17.8	12.3	23.1	17.9

Source: Bureau of Census, *Governmental Finances in 1983–84*. Washington, D.C.: U.S. Department of Commerce, October 1985. Compiled from Table 5.

The Structure of Tax-Spending Systems and Rural Local Government Stress

Table 4 presents measures of tax and spending centralization for the farm-dependent states. A centralized state-local tax structure combined with a decentralized spending system is evidence that state government aid is an important source of local revenue, and that local government assistance is a major state budget expense. A centralized tax structure and a decentralized spending system provides some insulation for rural governments from a weakening farm tax base, particularly in states with more diversified economies. Illinois, Kansas, Nebraska, Colorado, and Montana all have local taxes exceeding 40 percent of total state-local taxes. North Dakota, Kentucky, Arkansas, and Mississippi have less than 25 percent local tax receipts. That suggests local government services in the former states have more direct exposure to stress from a faltering farm economy (and a weakened property tax base) compared to the governments in the latter states simply because of the public finance structure.

On the other hand, exposure to revenue shortfalls in states with centralized revenue systems may come more quickly through reduced state aid resulting from stress at the state level.

A major determinant of the degree of centralization is the proportion of local school budgets that are financed by property taxes. That can be seen by comparing the percent of school costs financed locally with the percent that local taxes are of state-local taxes. Generally, the larger the percent of school spending that is financed locally, the greater the percent local taxes are of total state-local taxes. Midwest states plus Colorado and Montana make the most use of the property tax and use that tax to finance a larger percent of school spending. Local governments in those states are then, in general, more at risk from the financial crisis in agriculture, and rural school districts are particularly at risk as farm property tax

Table 4. Character of State-Local Public Finance Systems in Farm-Dependent States

	Local Taxes as % of S-L Taxes	Local Spending as % of S-L Spending	School Finances % Local	School Finances $ per pupil	School Finances Aid Formula[a]	% Property Taxes Levied on Farmer
Lake States						
Minnesota	28.5%	62.2%	41.5%	$3,376	F	9.12%
Wisconsin	31.0	61.9	57.7	3,553	GTB	10.46
Corn Belt						
Illinois	46.2	59.3	54.6	3,397	GTB/F	6.57
Iowa	38.5	58.3	53.7	3,239	F	20.28
Missouri	39.8	59.1	52.9	2,714	F	6.67
Northern Plains						
Kansas	41.7	62.5	50.8	3,361	GY	13.15
Nebraska	46.0	60.5	62.5	2,927	F	32.78
North Dakota	25.2	44.7	36.4	3,307	F	39.28
South Dakota	48.0	47.7	65.0	2,657	F	36.42
Appalachia						
Kentucky	21.2	43.3	18.6	2,550	EQ	4.65
North Carolina	26.8	56.5	26.9	2,460	F	3.35
Delta States						
Arkansas	24.2	52.0	33.1	2,257	F	8.39
Mississippi	23.0	55.1	25.3	1,962	F	4.51
Mountain States						
Colorado	49.9	64.8	53.3	3,261	F	3.74
Idaho	28.0	54.5	28.8	2,219	F	3.79
Montana	44.5	54.9	45.6	3,631	F/GY	11.85
U.S.	38.5	60.0	44.5	3,173		3.98

[a]F = foundation program, GY = guaranteed yield program, GTB = guaranteed tax base program, EQ = equalization aid program.

Sources: *School Finance at a Glance Chart*. Denver: Education Commission of the States, 1984; Bureau of the Census, *Governmental Finance in 1983-84*. Washington, D.C.: U.S. Department of Commerce, October 1985; and *Estimates of School Statistics 1983-84*. Washington, D.C.: National Education Association, April 1984.

assessments adjust with the economics of agriculture (Chicoine and Hoke).

Weakened farm property tax bases in most of the farm-dependent states will expose state budgets to increased expenditures through state school aid formulas and other general aid formulas driven by local tax capacity. The general form of school aid and school spending per pupil are given in Table 4.

The importance of the property tax base in the rural counties of farm-dependent states is reflected in the last column of Table 3 and in Table 4. The Northern Plains States plus Minnesota, Iowa, and Wisconsin have the most agriculturally dependent rural property tax bases and collect the greatest percent of all property tax revenues from farm real estate owners. That suggests local governments in those states face the greatest prospects for increased fiscal stress in the out years. The more diversified economies of the other states are reflected in farm property accounting for about 30 percent of rural tax bases with less than 10 percent of property taxes coming from farm real estate.

There is also evidence that rural governments in farm-dependent states were relatively more reliant on federal general revenue sharing, which was not renewed in 1986 (Lawson). For example, about 13 percent, 27 percent, and 19 percent of spending on rural low-volume roads by Illinois, Minnesota, and Wisconsin townships have been financed with federal general revenue sharing grants (Walzer, Chicoine, and McWilliams). The loss of those revenues will compound adjustments to accommodate demanded services with weakening local tax bases.

Indicators of State Government Fiscal Performance

Local finances are closely linked with state finances through the automatic operations of school and general aid formulas and through

Table 5. Distribution of Rural Real Property Tax Base in Farm-Dependent States, 1981

	Residential	Commercial & Industrial	Farm*	Other
Lake States				
Minnesota	25.9%	8.6%	65.0%	0.5%
Wisconsin	47.5	12.1	38.3	2.1
Corn Belt				
Illinois	32.1	30.4	35.5	2.0
Iowa	31.6	13.8	53.9	0.7
Missouri	41.1	15.7	41.2	2.0
Northern Plains				
Kansas	27.9	12.4	58.7	1.0
Nebraska	28.9	8.6	61.7	0.8
North Dakota	23.9	10.2	64.3	1.6
South Dakota	27.3	8.3	63.3	1.1
Appalachia				
Kentucky	50.8	10.0	30.4	10.0
North Carolina	56.1	15.7	22.9	5.3
Delta States				
Arkansas	44.5	15.1	37.2	3.2
Mississippi	55.9	13.0	30.0	1.1
Mountain States				
Colorado	50.2	23.7	9.9	16.2
Idaho	50.0	14.1	31.6	4.3
Montana	47.7	20.6	31.0	0.7
U.S. Average	44.6	14.8	26.0	14.6

*Farm and Acreage

Source: Bureau of Census. *Taxable Property Values and Assessment-Sales Price Ratios.* 1982 Census of Governments. Washington, D.C.: U.S. Department of Commerce, 1984. Table 4.

special fiscal assistance. The extent to which states can assist troubled rural governments depends on the financial well-being of the state. Table 6 presents some indication of the fiscal performance of the state governments of farm-dependent states. Eight of the states did not have the fiscally prudent general fund balance (5 percent of general fund spending) at the end of fiscal year 1985. Those eight had a general fund balance below the national average of 4.5 percent. At the end of fiscal year 1986 eleven farm-dependent states were below that level and only two states have forecast an end-of-year balance for fiscal year 1987 at or above 5 percent of general fund expenditures.

The trend in end-of-year balances suggests some stress in state government finances, but caution is needed in drawing direct causality with a poorly performing farm economy. Fund balances are typically drawn down and tax increases are avoided in election years (i.e. 1986), and spending and revenue changes during fiscal year 1987 will occur in most states that could improve end-of-year fiscal positions. In addition North Dakota, Montana, Kansas, and Mississippi have faced significant reductions in energy-based taxes because of weaknesses in energy markets.

Another indication of stress is the change in state revenues. A revenue growth rate below the national average gives some indication that the revenue base is not growing at a rate necessary to continue full financing of current state and local programs. In fiscal year 1986 ten of the sixteen farm-dependent states had revenue growth rates below the national average. In fact Kansas, North Dakota, Nebraska, and Montana experienced actual reductions in state revenues without reductions in state tax rates.

Minnesota enacted a reduction in state tax rates (after earlier increases) causing a drop in fiscal year 1986 revenues. However, three of the farm-dependent states raised the general sales tax rate in 1986—Idaho, Kansas, and Nebraska. When asked to identify leading budget issues facing state legislatures in fiscal year 1987, fiscal officers in ten of the sixteen farm-dependent states listed the state budget as the leading issue (Nebraska identified local government, and Wisconsin identified property tax relief). In the other states education remained the top budget issue in fiscal year 1987 (Gold). In five states (North Dakota, Iowa, Nebraska, Arkansas, and Montana) cuts in state aid to education were initiated after the fiscal year 1986 budget was adopted. Because of the generally broad support for state school aid, those actions are a strong indication of state budget stress. Those five states plus Minnesota and Mississippi made cuts in their fiscal year 1986 budgets (Lawson).

The last two columns in Table 6 report the number of rural counties identified as having high and rising fiscal effort between 1977 and 1982 and very high fiscal effort in 1982. The benchmark for those measures is the average for U.S. nonmetropolitan counties with fiscal effort compared to income. In general, more counties from the Northern Plains, Lake States, and Corn Belt States are included here compared to the number of counties listed from the other farm-dependent states.

Table 6. Indicators of Fiscal Stress for State and Local Governments in Farm-Dependent States[a]

	State Government					Rural Local Governments	
	FY85	FY86		FY87		Counties with High and Rising Fiscal Effort 1977–82	Counties with Very High Fiscal Effort 1982
	Balance	Balance	Change in Revenues	Balance	Change in Revenues		
Lake States							
Minnesota	9.3%	5.6%	-7.6%	1.4%	-4.7%	37	8
Wisconsin	7.7	4.7	6.3	2.0	0.7	31	3
Corn Belt							
Illinois	4.6	2.7	1.9	4.7	2.0	17	2
Iowa	0.0	0.0	1.8	0.5	2.6	26	4
Missouri	6.6	4.3	7.3	0.1	11.2	30	6
Northern Plains							
Kansas	8.3	2.1	-0.8	5.5	11.6	41	24
Nebraska	1.6	2.1	6.5	-0.2	1.4	17	18
North Dakota	25.4	20.2	-14.2	-4.9	-12.0	3	3
South Dakota	9.2	5.5	5.1	1.3	7.9	10	2
Appalachia							
Kentucky	3.8	7.7	8.6	4.5	8.3	4	2
North Carolina	0.3	6.3	3.0	0.9	5.9	5	0
Delta States							
Arkansas	3.2	0.0	2.6	-18.7	6.0	0	0
Mississippi	5.1	3.5	5.4	0.4	-0.7	21	3
Mountain States							
Colorado	2.5	0.4	0.0	7.8	9.6	0	0
Idaho	2.1	0.0	3.2	0.9	5.9	9	1
Montana	2.8	3.7	-1.4	0.5	3.1	25	26
U.S. Average	4.5	2.7	5.3	0.9	5.1	635	258

[a]Revenue changes from 1986 to 1987 are based on budgeted 1987 revenues. In 1985 Minnesota reduced its personal income tax rate. In 1985 Nebraska imposed several tax rate changes.

Source: Gold, Steven D. *State Budget Actions in 1985, in 1986.* LFP 49 and LFP 54. Denver: National Conference of State Legislatures, 1985 and 1986. Local government information compiled from computer tables provided by Richard J. Reeder, ERS, USDA, Washington, D.C. March 1986. High effort is defined as above the U.S. nonmetro county average for own-source general revenue in 1982 and rising effort is an increase in own-source general revenue effort from 1977 to 1982. Very high fiscal effort is revenue efforts (own-source) one or more standard deviations above the U.S. nonmetro county average in 1982.

Conclusion

An understanding of the implications of the performance of any sector for the fiscal health of state and local governments depends on the relative importance of the sector to tax bases and the institutional organization of state-local public finance and service delivery systems. This review suggests that local governments in farm-dependent states that are more dependent on property taxes will face fiscal challenges, and the timing of those challenges will be related to farm and nonfarm property reassessments and state intergovernmental aid policies. Rural local governments and, in particular, school districts, townships, and county governments in the Northern Plains, Corn Belt, and Lake States appear most at risk. (Table 7.)

Several state governments in those regions, particularly Iowa, Nebraska, Kansas, and North Dakota, plus Montana appear not to be in a strong position—without state tax increases—to lend significant assistance. The downturn in the energy economy has been problematic for state budgets in Kansas, North Dakota, Mississippi, and Montana.

Whatever the current level of fiscal stress, it will almost certainly increase as the public economies of farm-dependent states adjust to the current economics in agriculture. The nature of the fiscal institutions in states assures that state budgets will incorporate economic changes more quickly than local budgets. While a full-fledged fiscal crisis is not eminent in every community in rural America, the fiscal pressures related to the financial crisis in agriculture will provide

Table 7. Evidence of Fiscal Stress or the Strong Potential for Fiscal Stress in the State-Local Government Sectors of Farm-Dependent States

	State Government Stress Evident	Local Government Stress Evident
Lake States		
Minnesota	Yes	No
Wisconsin	Yes	Yes
Corn Belt		
Illinois	No	Yes
Iowa	Yes	Yes
Missouri	No	Yes
Northern Plains		
Kansas	Yes	Yes
Nebraska	Yes	Yes
North Dakota	Yes	Yes
South Dakota	No	Yes
Appalachia		
Kentucky	No	No
North Carolina	No	No
Delta States		
Arkansas	Yes	No
Mississippi	Yes	No
Mountain States		
Colorado	No	No
Idaho	Yes	No
Montana	Yes	Yes

opportunities for institutional reform and reorganization of local public finance and governance structures to improve the efficiency of local governance systems serving rural and agricultural regions and to realign the capacity for local governance with the restructured rural economy (Smith). Elected state and local public officials will face tough choices that will either facilitate the transition underway or retard the evolution of public economies in accordance with a changing farm sector.

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Firm Level Adjustments to Financial Stress

Peter J. Barry, Paul N. Ellinger, and Vernon R. Eidman

The breadth and depth of the current financial problems in agriculture have created a significant dilemma for farmers, lenders, policy makers and others seeking viable solutions. Various groups have increased pressure for continued and even greater public assistance. This paper evaluates the farm level effects of various responses to financial stress. In particular, the results of a simulated financial analysis of alternative farm types are reported as an information base for use in evaluating the financial consequences of various policy options and strategies that farmers and lenders might follow in responding to financial stress. The analysis is intermediate term in length, projecting changes in financial performance over a four-year period.

The policy options and response mechanisms under consideration consist of a set of generic options in the management of assets, liabilities, and equity capital by farmers. No attempt is made to align the generic options with specific policy proposals, financial instruments, or credit programs. Rather, the focus is on demonstrating effects of changes in key financial parameters on major measures of farm performance. The generic response options could be initiated by a variety of programs, instruments, and managerial actions that are examined by others at this symposium. In the following sections of the paper, we establish a simplified conceptual framework, summarize the possible responses to financial stress, cite the results from a related study by regional research project S-180 *Financial Stress in Agriculture: Policy Options and Financial Consequences for Farmers*, present a more in-depth analysis for the Illinois and Minnesota farms, and consider the implications.

Peter J. Barry is a professor of agricultural finance at the University of Illinois, Urbana-Champaign. Paul N. Ellinger is an agricultural economist at the University of Illinois. Vernon R. Eidman is a professor of agricultural and applied economics at the University of Minnesota.

Financial Structure Issues

A simple conceptual framework for analyzing the relationships between financial stress and financial structure is portrayed by a profitability model in which a firm's rate of return on equity capital (i_e) is expressed as a weighted average of the difference between its return on assets (r) and its cost of debt (i_d), where the weights are the ratios of assets to equity (A/E) and debt to equity (D/E), respectively, and the profit measure is net of withdrawals for taxation (t) and consumption (c). Those relationships are expressed as

$$i_e = \left[(r) \ {}^{A}/_{E} - (i_d) \ {}^{D}/_{E} \right] (k) \qquad (1)$$

where $k = (1-t)(1-c)$.

If, as others (e.g., Melichar; U.S. Department of Agriculture) have done, financial stress is defined by combinations of those variables that yield a zero rate of return to equity, then expression (1) can be solved for the debt-to-equity ratio that yields $i_e = 0$. The result is

$$ {}^{D}/_{E} = \frac{-r}{r-i} \qquad (2)$$

As long as the rates of taxation and consumption are less than 100 percent, a zero rate of return on equity will occur only if r is less than i_d. If, for example, $r = .03$ and $i_d = .10$, which have been plausible figures in the 1980s, then i_e will be zero for $D/E = .428$, or, equivalently, for a debt-to-asset ratio of .300. Clearly, the level of leverage associated with financial stress (here $i_e = 0$) will be higher as the rate of return on assets is lower and/or the rate of interest is higher.

Moreover, the model provides for numerical estimates of both those values, along with the firm's leverage position.

The model also shows some of the intuitively obvious alternatives for remedying financial stress. That is, profitability will increase as the rates of return on assets are higher, and the rates of interest, taxation, and consumption are lower, and those effects grow stronger as financial leverage increases. To illustrate, and recalling the linear properties of the model, the effect of a change in the rate of return on assets on the rate of return on equity in (1) is

$$\Delta i_e / \Delta r = (k) \; A/E \qquad (3)$$

That is, an increase in the rate of return on assets by one unit will increase the rate of return on equity by the product of the net rate of savings times the asset-to-equity ratio.

Similarly, the effect of a change in the rate of interest on debt on the rate of return on equity is

$$\Delta i_e / \Delta i_d = -(k) \; D/E \qquad (4)$$

That is, an increase in the cost of debt by one unit will decrease the rate of return on equity by the product of the net rate of savings times the debt-to-equity ratio.

Finally, the effect of a change in leverage on profitability, with r and i_d held constant is

$$\Delta i_e / \Delta D/E = (k)\,(r-i) \qquad (5)$$

That is, an increase in the debt-to-equity ratio by one unit will increase the rate of return on equity by the product of the net rate of savings times the rate of return on assets minus the interest rate. If r is less than i_d, then the profitability effect is a negative one, so that reductions in leverage will increase profitability by the difference between r and i multiplied by the net rate of savings.

The conceptual model could be extended to include other measures of financial stress (liquidity and solvency), other variables, explicit risk factors, and other relationships among variables (i.e., nonlinearities). However, the approach taken above highlights some of the key qualitative relationships and allows some simple numerical analysis in order to identify specific options meriting further consideration. Moreover, the various extensions are better left for the simulation analysis in which the numerical specifications can be developed more fully.

One can conceive of a farm business as striving for a preferred organization (i.e., a target, norm, or standard) of its financial structure and income-generating activities. That organization is sought by the efforts of the farm operator even though periodic shocks from various sources disturb the organization and call for corrective action. In the 1980s the reductions in farm income and land values (business risks) along with higher interest rates and high debt loads (financial risks) clearly disturbed the longer-term financial organizations of many farm businesses that had resulted from the more favorable times of the 1970s. As a result, the search is on for effective managerial responses, policy responses, or both that will enable farmers to reachieve a preferred financial organization, perhaps at a revised level that reflects a more conservative financial outlook for agriculture.

Overview of Response Options

Most financially stressed farmers have responded to financial stress by reducing, delaying, or eliminating capital expenditures, living more frugally, cutting production expenses, emphasizing cash flow relative to profitability, seeking off-farm employment (which was difficult in the general recession of the early 1980s and remains difficult in areas where the agricultural and energy recessions are widespread), and selling highly liquid financial assets and inventories. As conditions worsened, the focus shifted toward downsizing the scale of operations through sales of capital assets including machinery, breeding livestock, and land. The traditionally thin land market was stressed even further as more land became available for sale with few if any prospective buyers. The acquired properties of lenders (especially land held by Federal Land Banks) have increased and those lenders are seeking orderly ways to liquidate those holdings. Leasing along with asset sales and

lease-back arrangements have had greater prominence as a means of relieving cash flow pressures.

Government responses to financial stress in agriculture have had considerable attention. A number of states have provided counseling and financial assistance programs to troubled farm borrowers. At the federal level, the debt assistance program for recoverable farmers administered by the Farmers Home Administration (FmHA) was initiated in late 1984, and various other changes in FmHA lending programs have occurred. Another large assistance program was passed by Congress in early 1985 but was vetoed by President Reagan due to its high budget costs.

Many observers have viewed the past initiatives at the federal and state levels as partial responses to farm stress and have predicted the need for more financial assistance before a significant agricultural recovery occurs. Numerous proposals have surfaced and bills have been introduced in Congress and in state legislatures calling for various public responses. Included among the proposals have been calls for continued forbearance by lenders, debt moratoria, deferrals of debt obligations, debt restructuring, loan write-downs, interest subsidies, expanded government lending, government loan guarantees, formal mediation procedures, new bankruptcy procedures, counseling and education programs, relocation assistance, public land acquisition, changes in tax policies, and other forms of assistance for financially troubled borrowers. Most of those suggestions have direct implications for the financial structure of farm businesses and can be considered in three broad categories: liability restructuring, asset restructuring, and infusions of new equity capital.

In liability restructuring, actions taken to reduce levels of indebtedness, interest rates, or both would push down financial leverage and ease the pressures on capital structures. Actions taken to lengthen the maturity structure of debt, and defer or stretch out repayment obligations would ease the pressures on near-term cash flows. Under severe stress the quickest and perhaps most effective response for a farmer would be a write-down of indebtedness to levels that would be financially feasible to repay over the long term at market interest rates. However, that approach would have a relatively high cost to the government and/or farm lenders. Interest write-downs, especially temporary ones have similar effects and are generally preferred to principal write-downs by lenders. Maturity and repayment restructuring, perhaps involving loan guarantees and risk sharing, offer another alternative. They buy time for the parties involved and keep the lender and borrower working toward a longer-term solution. However, those alternatives imply a pushing ahead of the debt obligation that could grow significantly over time. Thus maturity and repayment restructuring alone do not solve liquidity and solvency problems unless a significant recovery of farm income occurs.

Asset restructuring options involving sales and lease-back are effective means of generating substantial amounts of cash as long as buyers for the assets are readily available. Moreover, the lease-back alternative allows the seller to maintain asset control and business size, and experience improvements in cash flow from the earnings of the leased asset along with the reduced repayment obligation. However, as many farmers have found, widespread sales of machinery, breeding livestock, and land have encountered thin markets with few if any possible buyers, and have thus produced further downward pressure on asset sales. As a result policy mechanisms may be needed to facilitate the liquidation of fixed assets, especially farm land, in a fashion that protects the integrity of the asset markets, helps to buffer the downturn in asset values, and gives farmers and their lenders a chance to orderly liquidate or recapitalize the farm business. Other asset restructuring alternatives focus on the orderly, cost-effective transfer of labor and human capital either partially or completely out of agriculture, and on improving the quality of human capital remaining in agriculture through further development of farmers' skills in financial management.

The infusion of new equity capital into farm businesses would enable reductions in financial leverage and dispersion of risks among a wider set of claimants on farm assets. Equity infusions raise sensitive issues about the ownership structure of agriculture,

but they warrant careful attention. The new equity could come from a debt holder exchanging his obligation for an equity position, or from an outside investor providing additional funds to reduce indebtedness. A careful consideration of the costs and benefits of separating the ownership and management of farm assets would be needed. Mechanisms might also be needed to effectively allocate management responsibilities among the equity claimants, to assure the farmer's long-term tenure position, to provide for the transfer of equity claims, and to provide for the possible retirement of the equity infusion as business conditions improve. The role of public policy in outside equity infusions may involve reassessing current legislation that discourages such arrangements. A stronger policy response would involve direct government action to stimulate or facilitate the flow of outside equity capital into agriculture.

Financial Simulation Analysis

The financial simulation analysis reported here arose from the authors' involvement with a recently completed study conducted by a group of researchers participating in Southern Regional Research Project S-180 *An Economic Analysis of Risk Management Strategies for Agricultural Production Firms.* That study was a coordinated effort using common methods of analysis and model specifications to evaluate the effects of various policy options and response strategies on the financial performance of fourteen representative farms in thirteen states. The S-180 study tested the effects of six policy options at *one* level of implementation on each representative farm. The tests were conducted at each of three different levels of beginning financial leverage and under three economic scenarios depicting specified changes in the farm's operating revenues and initial land values. The farm-level effects were evaluated by tracking eight measures of financial performance for each of the farms.

The S-180 study provided a rich information base for comparing the farm's initial situation with the effects on financial performance of the various policy options and response strategies. However, confining the policy options and economic scenarios to one particular level of implementation precluded making meaningful comparisons among the policy options at the different levels. The use of the multiple performance measures also made it difficult to evaluate overall performance due to possible trade-offs among those measures. This paper extends the analysis for the Illinois and Minnesota farms by evaluating each of the policy options at several levels of use and by formulating a composite score, or performance index, to reflect the combined effects of a selected set of the performance measures.

The six policy options and response strategies include the following: (a) sales of the farm's assets with a lease-back of those assets by the farm operator (sales were at current market values with proceeds applied against indebtedness), (b) sales of the farm's assets without lease-back, (c) write-downs of the farm's initial indebtedness, (d) reductions in interest rates on the farm's indebtedness, (e) deferrals of scheduled payments of principal and interest on intermediate-term and long-term debt for two years with no accrual of interest in the interim, and (f) infusions of outside equity capital to displace the farm's indebtedness. Each policy option is implemented at 10 percent intervals ranging from a value of zero for the base case to a maximum of 70 percent. The upper limit is considered realistic and feasible to handle in this analysis. Thus, the interest rate reduction option is evaluated by specifying reductions of the interest rates on debt of 0 percent, 10 percent, 20 percent, . . . and 70 percent. Asset sales, debt reduction and equity infusions are similarly evaluated. The debt deferral option ranges the amount of principal and interest deferred from 0 percent to 70 percent for the two-year period.

The base line scenario for evaluating each of those policy options, like the S-180 project, uses a common set of projections on commodity prices, input costs, rates of growth for selected costs of production, and interest rates to determine numerical specifications of those parameters for the two farm situations. Those projections were obtained from a macroeconometric model of the U.S. agricultural sector that is operated by the Food and Agricultural Policy Research Institute at the University of Missouri. Those

projections serve as the basis for specifying a base line scenario for each farm situation.

Two other scenarios representing optimistic and pessimistic variations from the base line scenario are also evaluated, although in the Illinois and Minnesota analysis those scenarios are only applied to the base case for each farm without applying them under each policy option. The optimistic and pessimistic scenarios contain a series of 5 percent increases and decreases, respectively, in the farm's gross revenues and beginning land values, ranging from a 0 percent change to a 50 percent change.

The beginning financial structure of each farm is represented by three levels of its debt-to-asset ratio; 20 percent for the low leverage case, 40 percent for the medium leverage case, and 70 percent for the high leverage case. Those leverage categories are consistent with those used in other studies.

Numerous performance measures can be formulated to evaluate the farm's financial performance over the four-year period. However, only three measures are specified here in order to avoid unduly complicating the evaluations. Profitability is measured by the rate of return on the equity capital of the farm operator earned during the fourth year after payment of income taxes, withdrawals for family consumption, and payments to outside equity holders in the equity infusion option. Liquidity is measured by the current plus intermediate ratio (current assets plus intermediate assets divided by current liabilities plus intermediate liabilities) at the end of the fourth year. Solvency is measured by the end of period debt-to-asset ratio. Moreover, a composite score is created on a range from zero to ten by equally weighting the scores for each of the three performance measures. The zero to ten scores are based on the particular value of each performance measure relative to a specified lower bound, norm, and upper bound for those measures using the procedures described in Appendix 1. The norms and bounds are determined within the range of each farmer's own simulated performance at the end of the fourth year. Thus they reflect a period of continued adversity in agriculture and are not necessarily related to historic performance measures or to longer-term equilibrium conditions.

The size, tenure position, rental arrangements, enterprise mix, and asset composition of each farm are based on the dual criteria of economic meaningfulness and farms with chronic economic problems. The Illinois farm contains 640 acres of which 31 percent are owned and 69 percent are rented on a fifty-fifty crop share lease. Crop enterprises consist of 60 percent of the acreage in corn at 135 bushels per acre and 40 percent in soybeans at forty-five bushels per acre. Beginning farm assets total $465,730 of which $320,000 are fixed assets with land valued at $1,500 per acre. The Minnesota farm contains 360 acres of which 56 percent are owned and 44 percent are rented on a cash basis at $65 per acre. Crop enterprises are 50 percent of the acreage in corn at 107 bushels per acre, and 50 percent in soybeans at 35.5 bushels per acre. In addition a hog enterprise is specified to produce ninety-six litters per year on a farrow-to-finish basis. Beginning farm assets total $347,846 of which $244,590 are fixed assets with land valued at $833 per acre. The mixes of current-, intermediate-, and long-term debt for each farm are in roughly the same proportions as the farm's mixes of current-, intermediate-, and long-term assets. The interest rates on the various types of debt are between 12 percent and 13 percent and the interest rates on short-term investments in financial assets are in the 6 percent to 9 percent range. Other details on the model specifications for each farm are given in Appendix 2.

Withdrawals for family consumption by the farm operator are specified to remain constant at $25,000 in real terms over the four-year period. Growth rates for most costs of production, machinery values, and other items range from 1 percent to 5 percent per year. However, land values are specified to remain constant over the four-year period. Income tax specifications reflect the new provisions of the 1986 act, including the revisions in tax rates, capital gains treatment, depreciation methods, and, for the debt reduction option, the exemption of discharged indebtedness from taxable gross income for farmers. The equity infusion option has a 10 percent required rate of return on the new equity capital that represents the significant risk position of the outside investor. The required return on

equity is specified as a withdrawal of cash from the firm's operations each year.

A farm-level simulation model is used to conduct the financial analysis for this study (Schnitkey, Barry, and Ellinger). The model runs on a microcomputer using a *Lotus 1-2-3* worksheet. It simulates the financial structure and performance of a farm business over a transition period of four years with an emphasis placed on the financial transactions of the farm. The simulated results are reported in terms of a set of coordinated financial statements from which the various performance measures are calculated.

Results of the Financial Analysis

The results of the simulation analyses are reported in a set of graphs for each farm (an accompanying set of tables reporting the specific numerical results is available from the authors). Each set of graphs indicates the response of the respective performance measures and composite scores to the various levels of the policy options for each leverage case. Thus, the effects of each policy option on each beginning leverage position (i.e., low, medium, and high leverage) can be evaluated in terms of the location and shape of the various graphs. The steeper is the slope of a graph, the greater is the response of the performance measure to the increasing use of that option. The farther apart are the lines of the graph, the greater is the disparity in performance for the various leverage positions over the range of use of the policy options. Changes in the slopes of the lines indicate changes in the relative effectiveness of the options as their levels of use change.

In general, the patterns of response are similar for the two farms, except for the asset sales option on the Minnesota farm in which the relationship between downsizing the scale of the farm and the presence of the livestock enterprise becomes important. The following discussion highlights the relationships for each of the policy options and response strategies, and identifies any differences between the farms that appear significant.

Figures 1a and 1b show the responses of the three performance measures and the composite score to increases in the farm's gross revenue and beginning land values for the Illinois and Minnesota farms, respectively. As gross revenue increases, the composite score increases sharply for each of the leverage cases in the Illinois farm and for the high and medium leverage cases of the Minnesota farm. The sharp increases occur primarily over the 5 percent to 10 percent range of change, then level out for the low leverage case while continuing to increase at more modest rates for the medium and high leverage cases. For both farms increases in gross revenue and land values of 25 to 30 percent are needed to bring the composite score of the high leverage case above the norm by the end of the four-year period. Even then, the farm's ending debt-to-asset ratio is still relatively high at that point—about 60 percent for the Illinois farm and nearly 50 percent for the Minnesota farm. However, the rates of return on equity for the high leverage case increase substantially over the full range—from -18.1 percent for the base case to nearly 26 percent for the Minnesota farm and from -72.7 percent for the base case of the Illinois farm to 22.2 percent at the 50 percent level of increased sales. As shown by the crossover patterns for return on equity in Figures 1a and 1b, those rates of return for the high leverage case are above the comparable rates for the low and medium leverage cases, reflecting the strong relationship between changes in profitability and leverage as leverage and the rates of return on assets increase. Moreover, the rates of return on equity for the medium leverage case eventually exceed those of the low leverage case as returns and land values continue to increase.

The decreases in gross revenue and land values in Figures 2a and 2b show significantly adverse effects for all three leverage cases. The high leverage cases never reach the lower bound for the composite scores in either farm, while the medium and low leverage cases reach the lower bound for revenue decreases of about 20 percent and 35 percent, respectively, for the Minnesota farm and 20 percent and 40 percent, respectively, for the Illinois farm.

Figures 3a and 3b indicate the responses of the three performance measures and the

Figure 1a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Optimistic Scenarios. *Illinois* Simulation

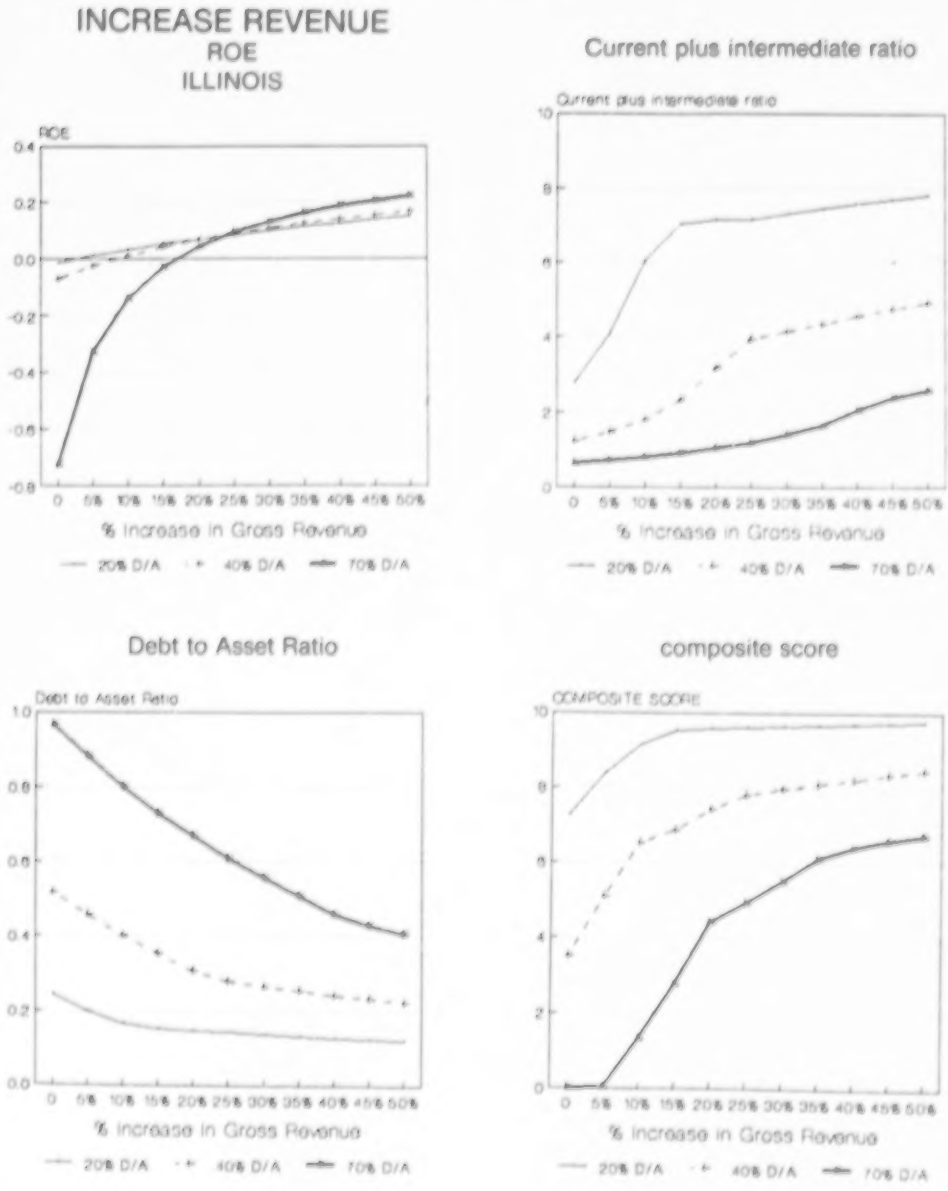
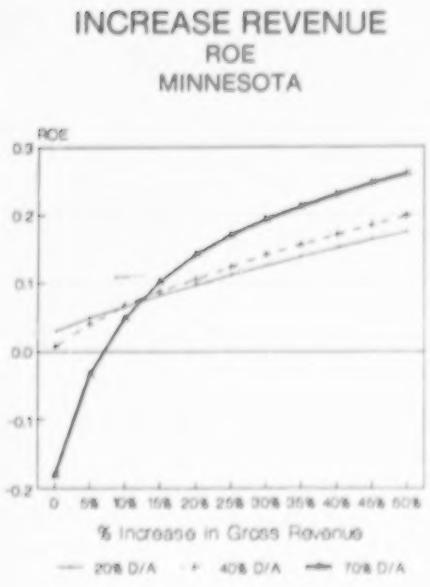
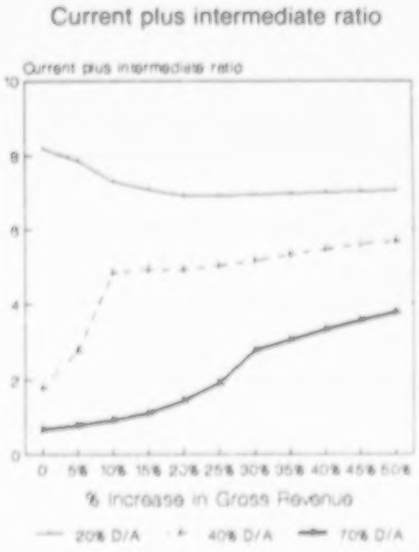
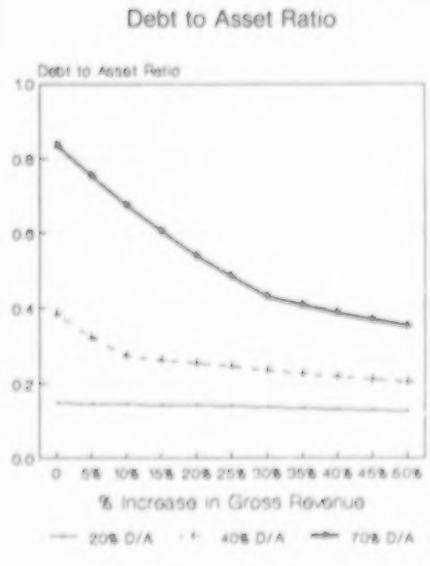


Figure 1b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Optimistic Scenarios. *Minnesota* Simulation







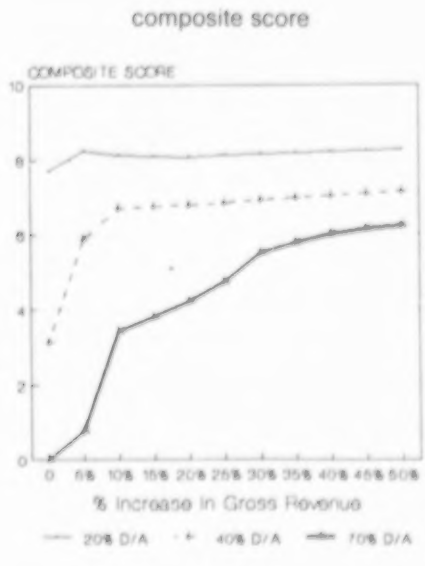


Figure 2a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Pessimistic Scenarios. *Illinois* Simulation

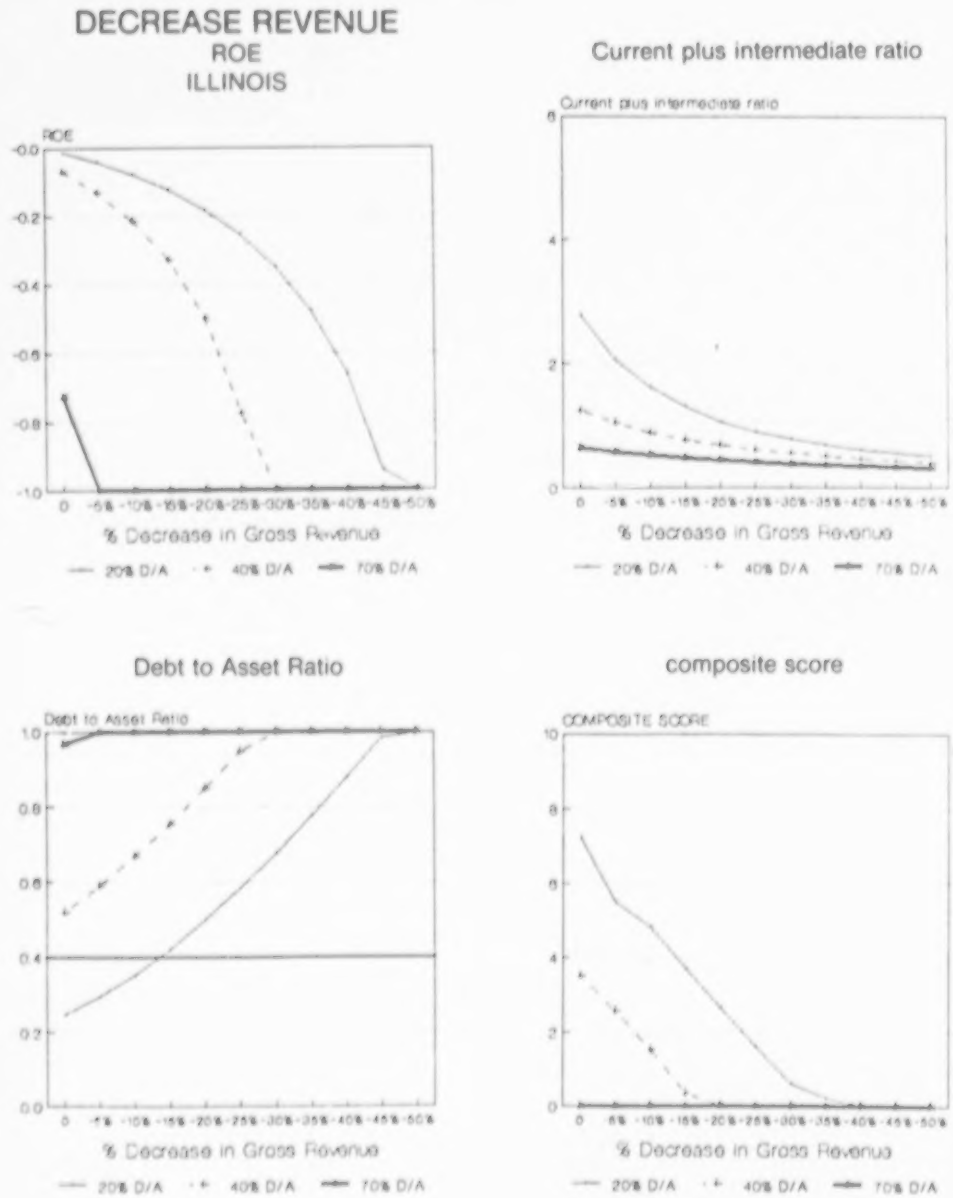
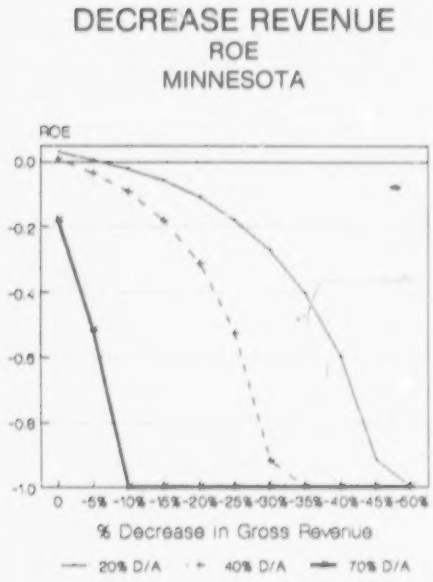
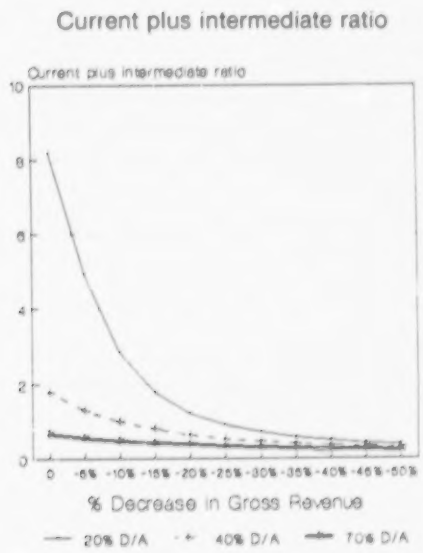
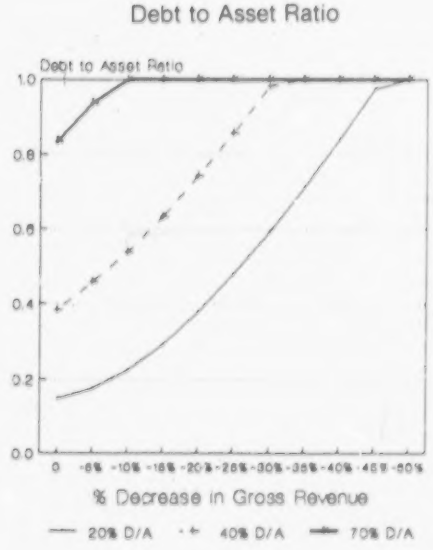


Figure 2b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Pessimistic Scenarios. *Minnesota* Simulation







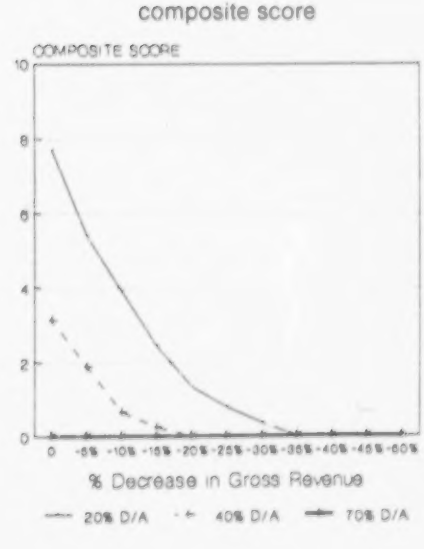


Figure 3a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Asset Sale; Lease-back Strategy. *Illinois* Simulation

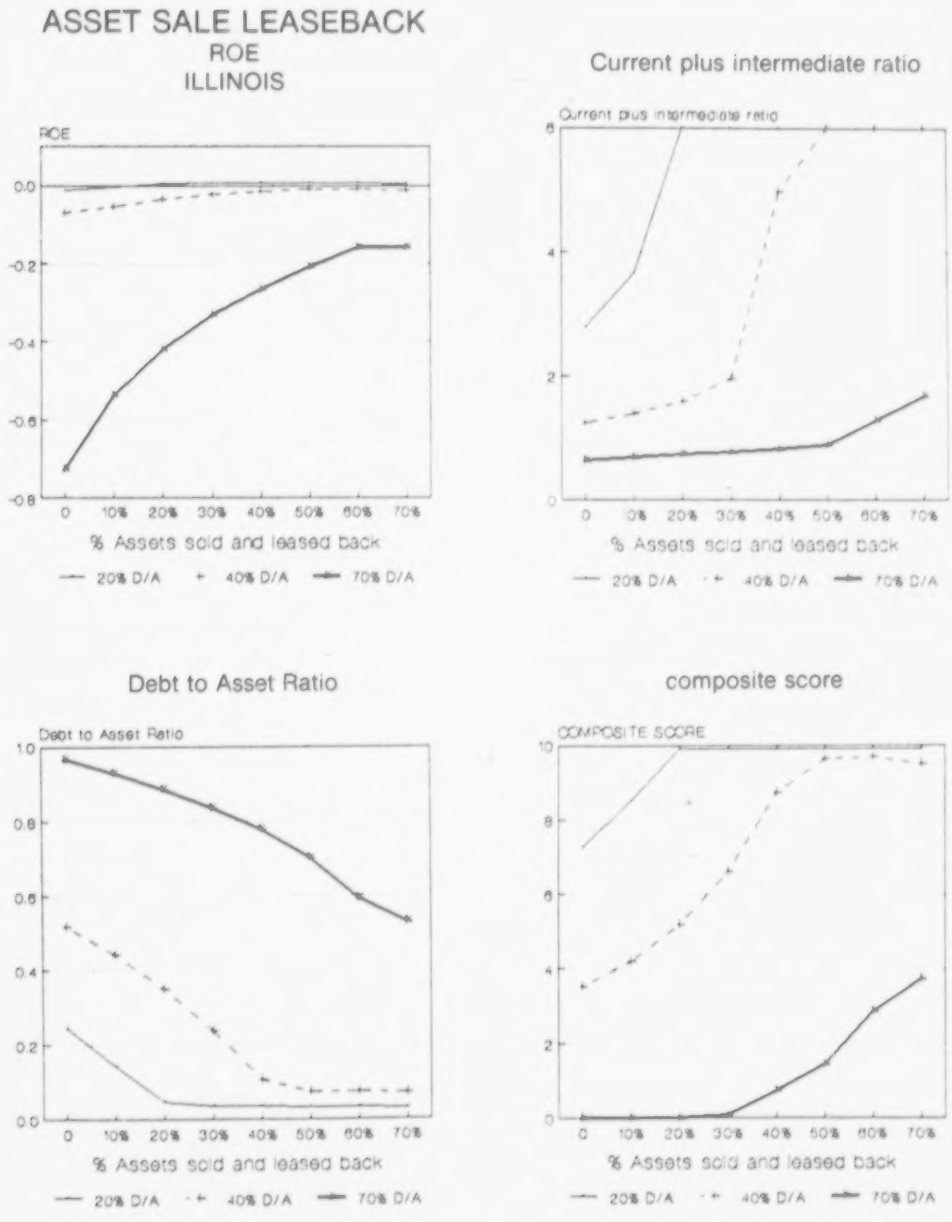
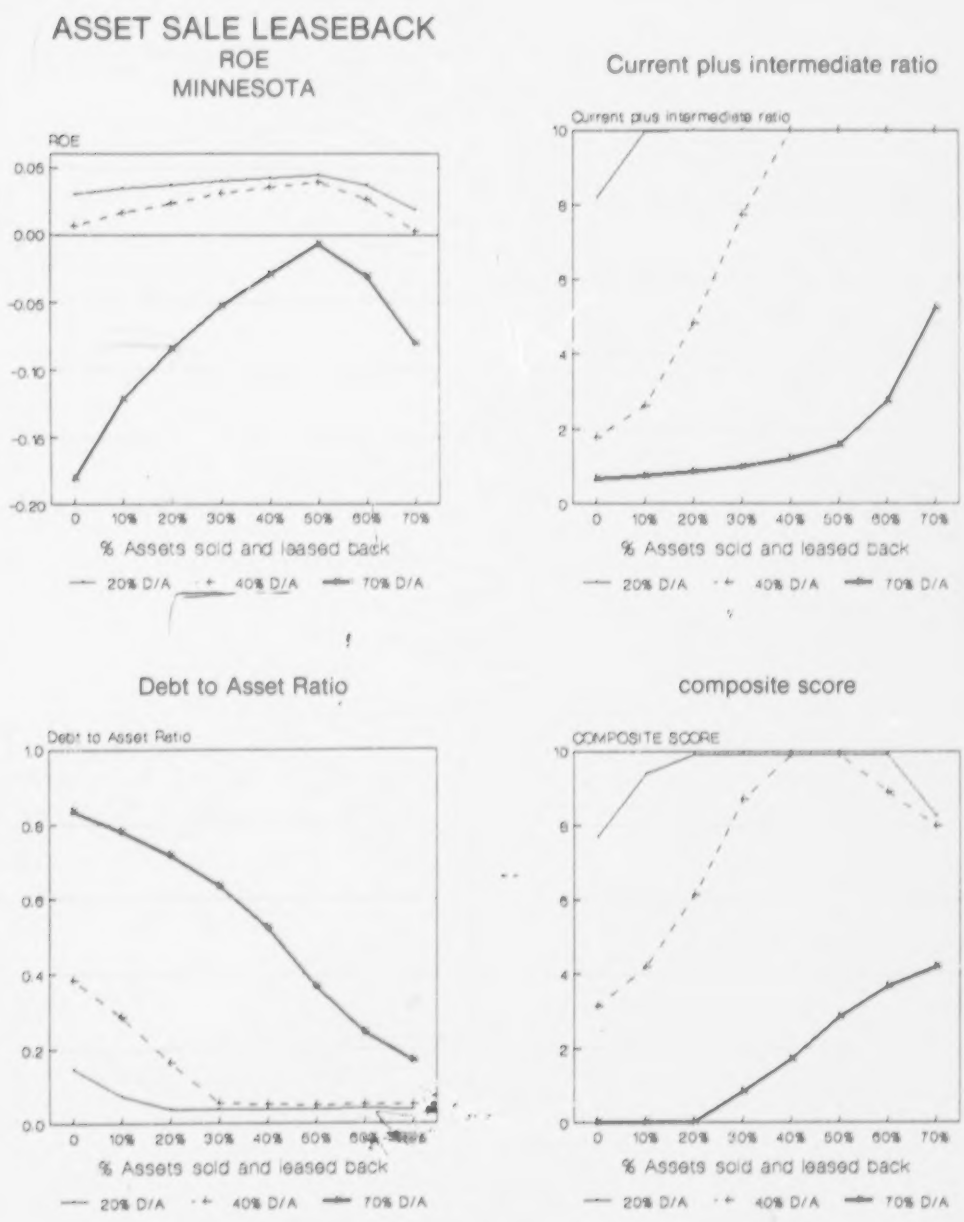


Figure 3b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Asset Sale; Lease-back Strategy. *Minnesota* Simulation



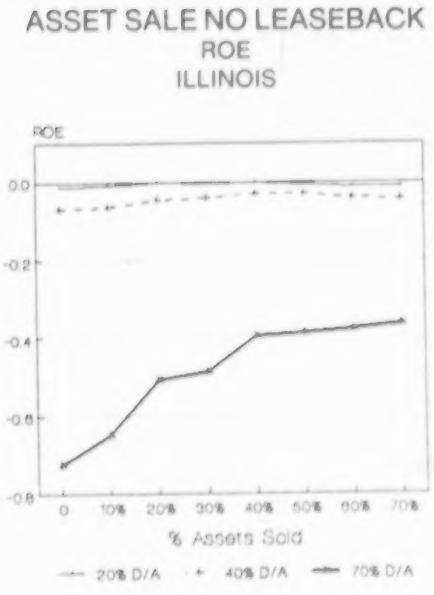
composite scores to the sales of assets with lease-back, ranging from 0 percent to 70 percent of total assets. For the Illinois farm, the asset sales consist of land and machinery in proportions judged to maintain a feasible balance of those two assets for production purposes. For the Minnesota farm, the asset sales consist first of sale of land and machinery, and then sale and lease-back of hog buildings. Figure 3a shows that the return on equity for the Illinois farm increases slightly for the low and medium leverage cases, while the response is considerably stronger for the high leverage case. The ending debt-to-asset ratio of the Illinois farm for the high leverage case declined moderately over the range of asset sales, but remains considerably above those of the lower leverage cases. The current plus intermediate ratios increase quickly and sharply for the low leverage case, sharply but later for the medium leverage case, and little and much later for the high leverage case. Finally, the composite score reaches the upper bound for the low leverage case for sales of about 20 percent of total assets, reaches the upper bound for the medium leverage case for sales of about 50 percent of total assets, and for the high leverage case, reaches only the lower bound for sales of 30 percent of total assets.

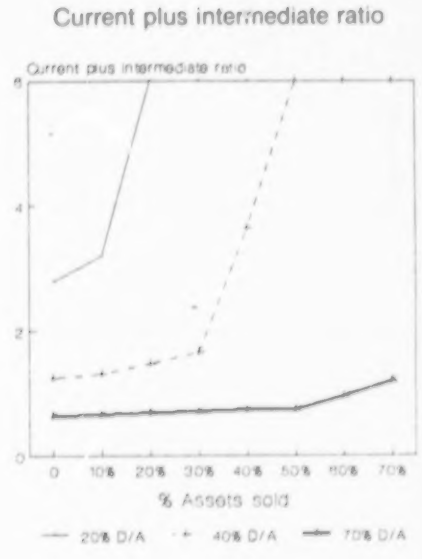
The patterns of response to asset sales with lease-back for the Minnesota farm in Figure 3b are similar to those of the Illinois farm except for the response of the rate of return on equity. The profitability measure increases sharply for the high leverage case through sales of 50 percent of total assets and then turns sharply downward. The response patterns for the low and medium leverage cases are much less pronounced but still show a downward movement for asset sales exceeding 50 percent. Those downturns are attributed to the sequence of asset sales and their relationships to the relative profitability of the crop and hog enterprises. Once the sale and lease-back of the hog buildings occurred, the rental obligation on those buildings was sufficient to have a strongly negative effect on the rate of return on equity. The downturn in profitability was offset in part by a substantial and continuous decline in the debt-to-asset ratio for the high leverage case (reaching about 17 percent for asset sales of 70 percent), and by much smaller declines for the other leverage cases. Thus, the composite scores for the three leverage cases of the Minnesota farm were very similar to the Illinois farm.

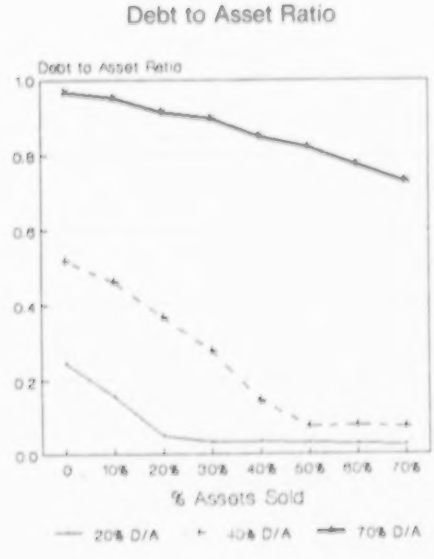
Figures 4a and 4b show the responses of the three performance measures and the composite index to asset sales without lease-back. The pattern of results for both farms is similar to asset sales with lease-back except for a generally lower level of performance and the more pronounced deterioration of performance for the highly leveraged Minnesota farm as asset sales increase. In general, a greater level of asset sale without lease-back is needed to achieve the performance levels obtained with lease-back for most of those situations. Thus, the results show the beneficial effects of attaining the liquidity provided by the sale of assets, while maintaining the same scale of operations and providing a continued stream of income from the assets that are leased back. However, total liquidation of the relatively profitable hog enterprise has devastating consequences for the Minnesota farm.

Figures 5a and 5b indicate the responses of the three performance measures and the composite score to write-downs of the farm's indebtedness in amounts ranging from 0 percent to 70 percent of the initial debt. The effects on the return on equity are minimal for the low leverage case, modest for the medium leverage case, and very strong for the high leverage case. However, the patterns of response for the high leverage case indicate that reductions in debt of about 40 percent for the Minnesota farm are needed to generate a positive return on equity, while the return on equity for the Illinois farm remains negative over that range. The current plus intermediate ratios increase at a moderate and relatively steady pace as more debt is reduced, and the debt-to-asset ratio trends down in each case, although at a faster pace as leverage increases. For both farms, levels of debt reduction are reached at which a shift in leverage classification occurs at the end of the four-year period. In the Illinois farm the ending debt-to-asset ratio for the high leverage case reaches the medium leverage case (40 percent) for a debt reduction of 60 percent, while the ending debt-to-asset ratio for the medium leverage case also reaches that of the low leverage case (20 percent) for a debt reduction of 60 percent. In the

Figure 4a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Asset Sale; No Lease-back Strategy. *Illinois* Simulation







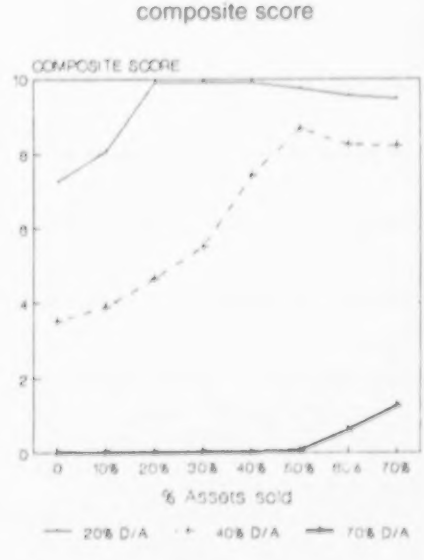


Figure 4b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Asset Sale; No Lease-back Strategy. *Minnesota* Simulation

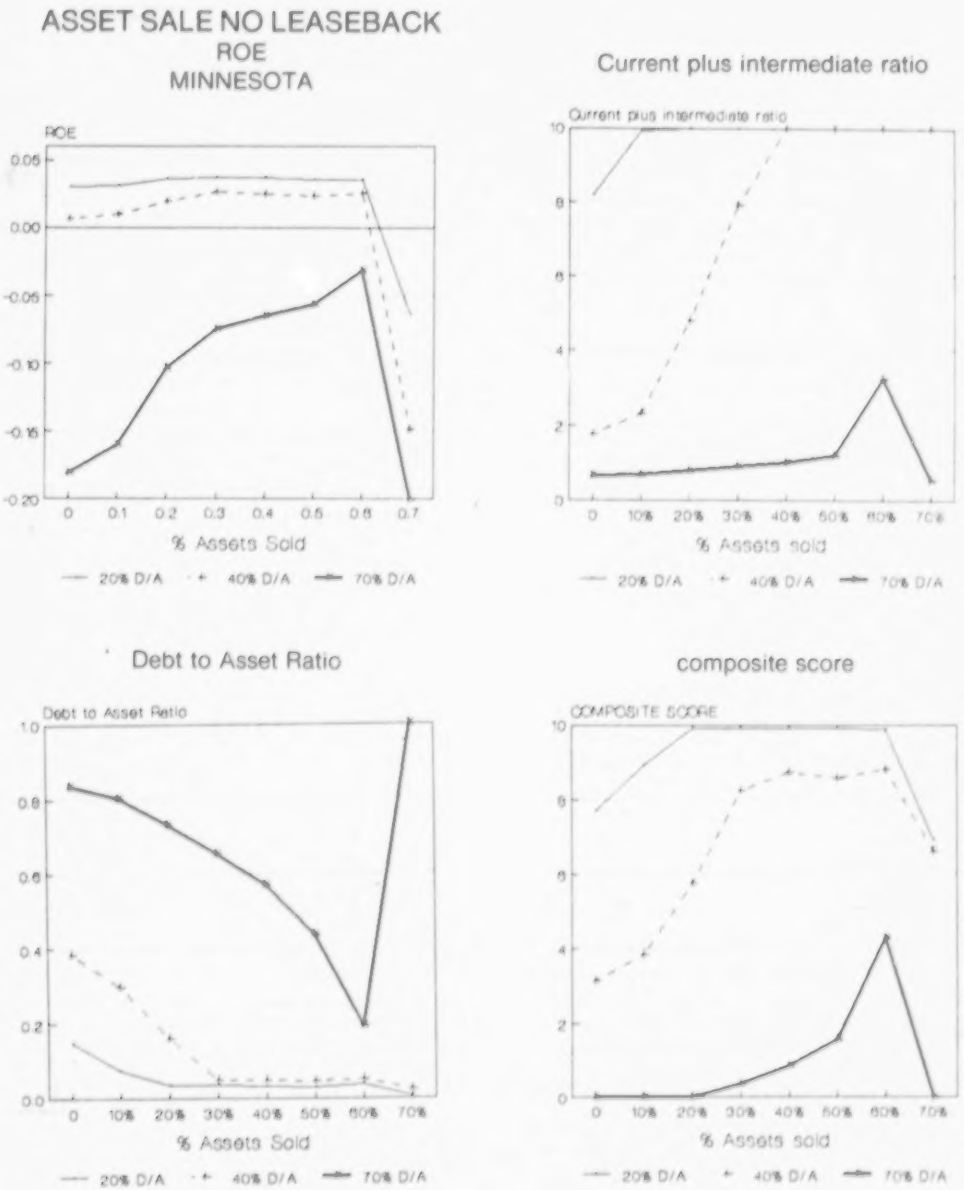


Figure 5a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Debt Reduction Strategy. *Illinois* Simulation

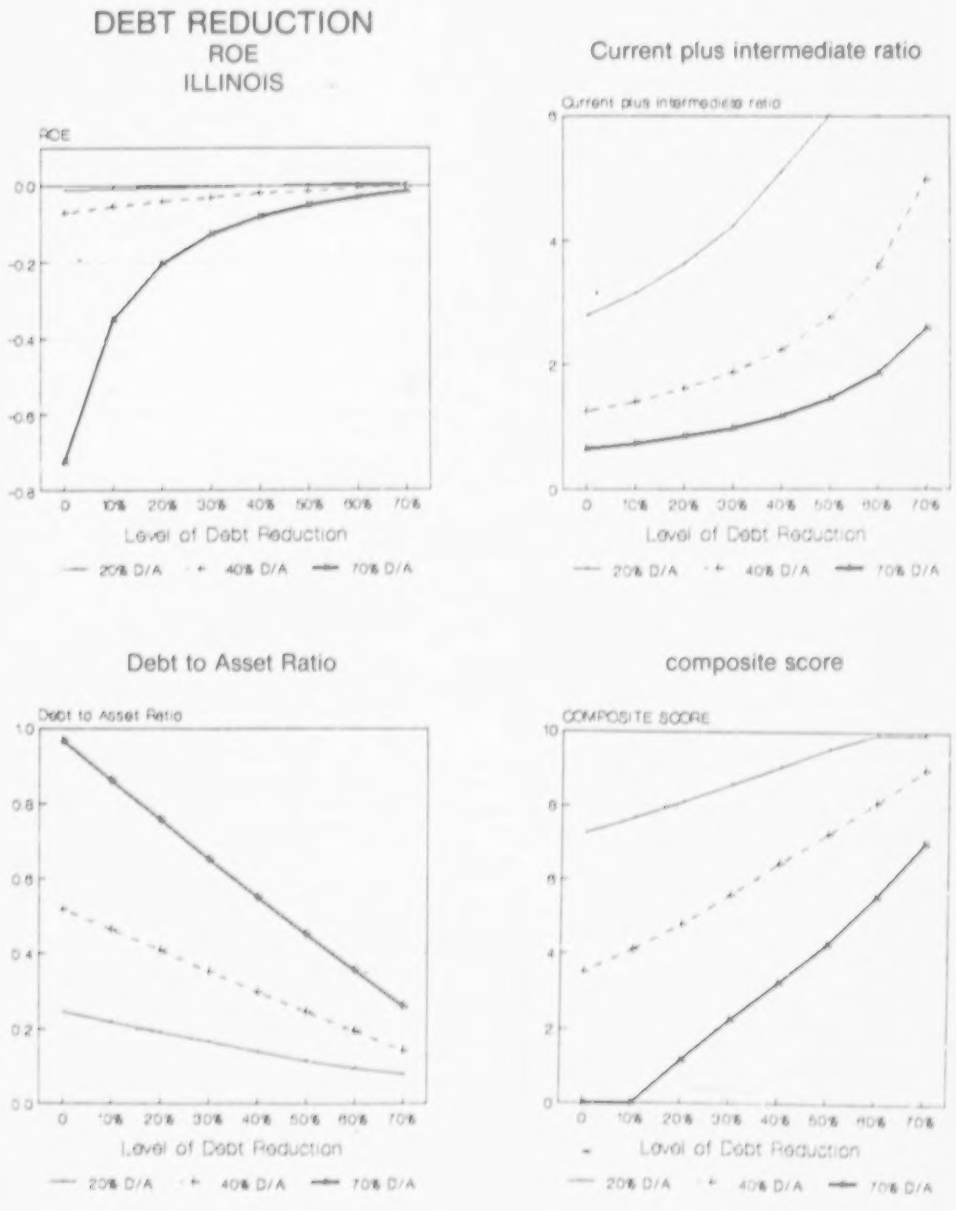
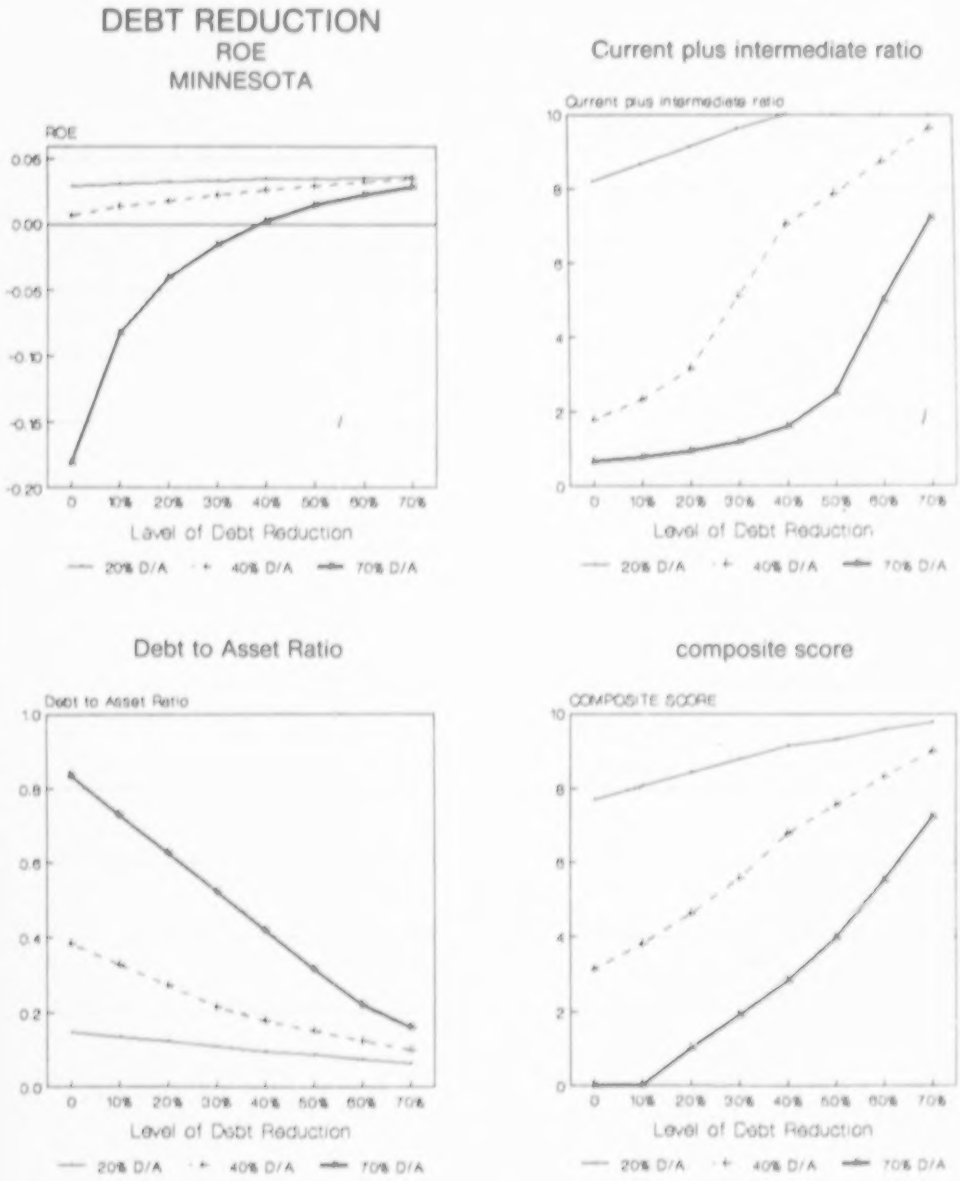


Figure 5b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Debt Reduction Strategy, *Minnesota* Simulation



Minnesota farm, the transfers of leverage classes for the high and medium leverage cases occur at debt reductions of 50 percent and 40 percent, respectively.

The composite scores increase steadily for each leverage case, although more so for the high leverage case as more debt is reduced. As Figures 5a and 5b show, the composite scores for the high leverage case only reach above the lower bound with a 20 percent reduction of initial debt for both the Illinois' and Minnesota farms, and then reach the norm when the debt reductions reach 60 percent. In contrast, the composite scores for the medium leverage cases reach the norm at debt reduction of 30 percent for both farms with the scores continuing to increase thereafter.

Figures 6a and 6b indicate the performance responses to reductions in interest rates ranging from 0 percent to 70 percent of their initial levels. Similar to the changes in economic scenarios shown earlier, changes in interest rates directly indicate the close relationships between profitability and leverage that were shown in the conceptual model. The greater is the firm's leverage position, the greater is its response of profitability to a reduction in interest rates. Thus, the high leverage case shows a very strong profitability response to interest rate reductions with its return on equity surpassing those of the lower leverage cases at interest rate reductions of 50 percent to 60 percent for the Minnesota farm. Similarly, the return on equity for the medium leverage case exceeds that of the low leverage case for an interest rate reduction of 70 percent. In addition, returns on equity for the high leverage case approach those of the lower leverage cases for the Illinois farm, although never exceeding zero. Moreover, the returns on equity for the low and medium leverage cases remain negative or nearly so over most of the range of interest rate reductions.

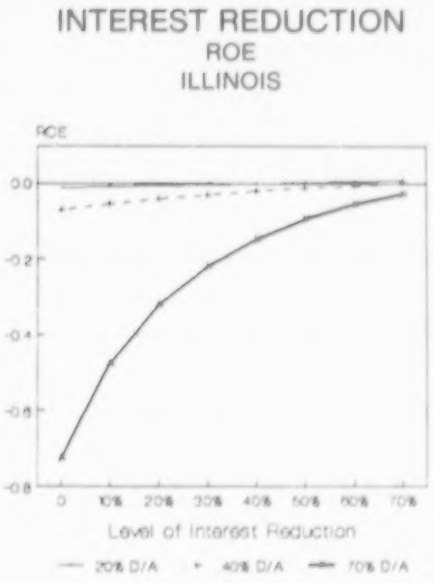
The current plus intermediate ratio again increases more strongly for the lower leverage cases in the Illinois farm and shows modest uptrends for the medium and high leverage cases. In contrast the current plus intermediate ratio has a declining pattern in the Minnesota farm due to the combined effects of asset depreciation and relatively low earnings on accumulated cash balances for the low leverage case in both farms. The debt-to-asset ratios decline at somewhat faster rates for the higher leverage cases. The ending solvency measures fall below the beginning debt-to-asset ratios over the full range of interest rate reductions for the low and medium leverage cases of the Minnesota farm, but only pass the beginning level (70 percent) for the high leverage case when interest reductions approach 50 percent. Debt-to-asset ratios for the Illinois farm remain consistently higher than their beginning values over the full range of interest reductions. Thus, while interest rate reductions may boost profitability considerably, they tend to have relatively little if any effect on the farm's vulnerability to risk over the four-year period, as indicated by the continued weak solvency position for the higher leverage cases.

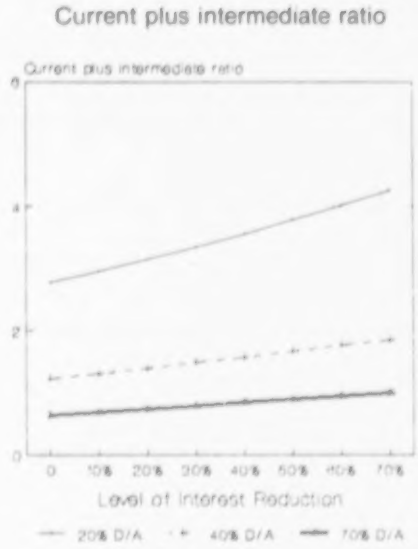
Consistent with the patterns of responses for the three performance measures, the composite scores increase more strongly in response to interest rate reductions that become greater as leverage increases. Still, however, the composite scores for the high leverage cases do not reach the norm, even with the 70 percent reductions in interest rates.

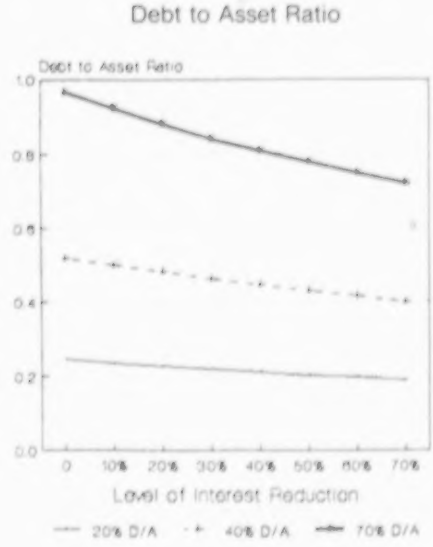
Figures 7a and 7b indicate the performance responses to two-year deferrals of up to 70 percent of the repayment obligations on intermediate and long-term debt. That response option yields very modest effects on the various performance measures over their ranges of use and relative to other policy options. The most noticeable effect is a steady uptrend in the return on equity for the high leverage case, although the return remains substantially below zero for both farms. Moreover, the composite scores for the high leverage cases stay at or below the lower bounds over most of the range of repayment deferrals. Thus the debt deferral option in and of itself appears to have little meaningful effect on the farms' performance measures by the end of the four-year period.

Figures 8a and 8b indicate the performance responses of the two farms to a range of infusions of equity capital that replace initial indebtedness, diversify ownership, and require a 10 percent rate of return to the new equity supplier. The pattern of results is very similar to the debt reduction option

Figure 6a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Interest Reduction Strategy. *Illinois* Simulation







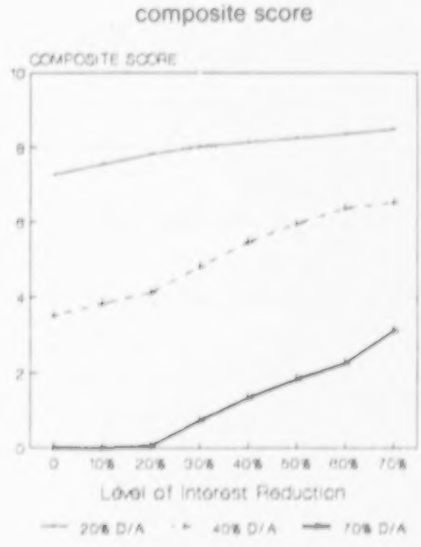


Figure 6b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Interest Reduction Strategy, *Minnesota* Simulation

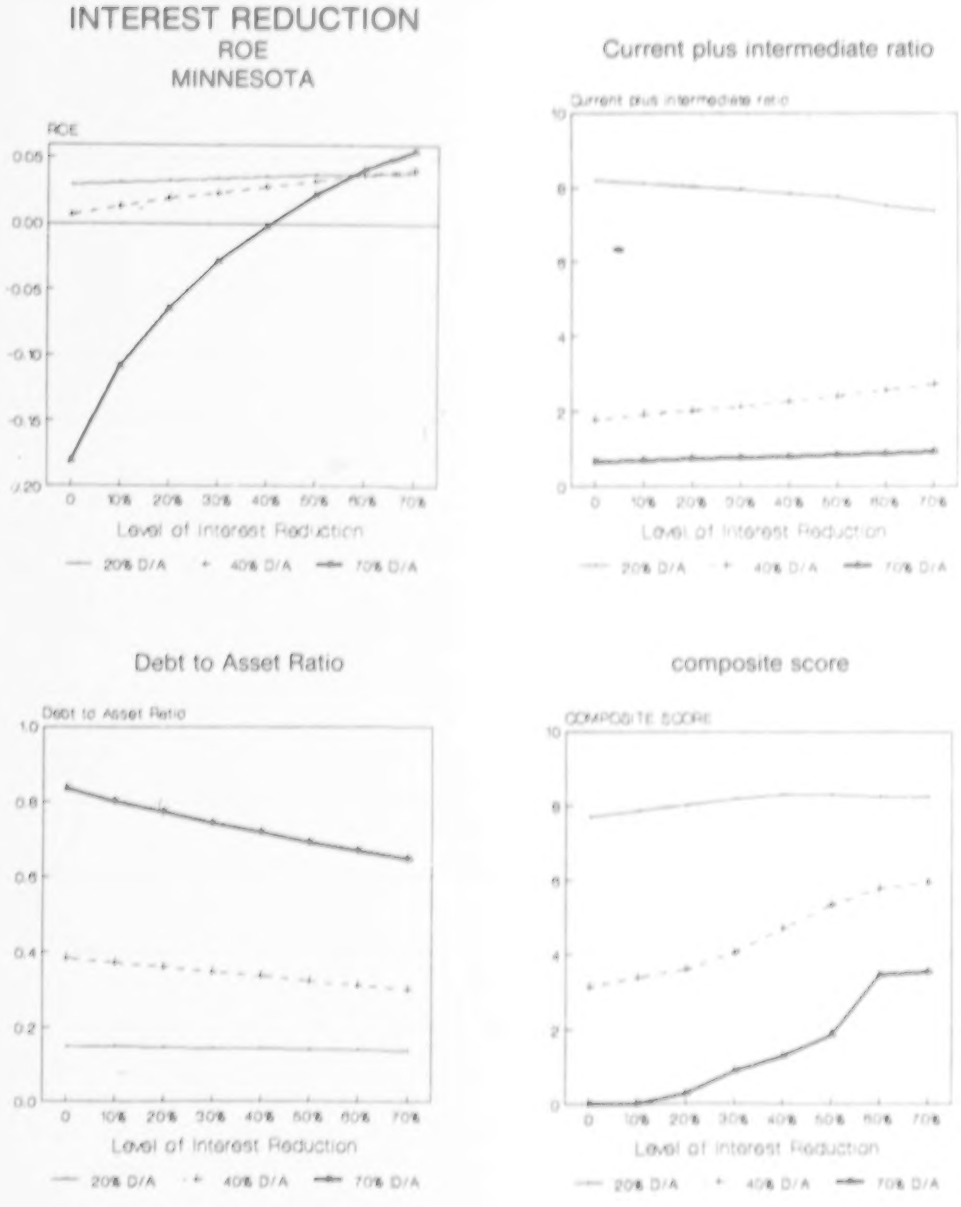


Figure 7a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Debt Deferral Strategy. *Illinois* Simulation

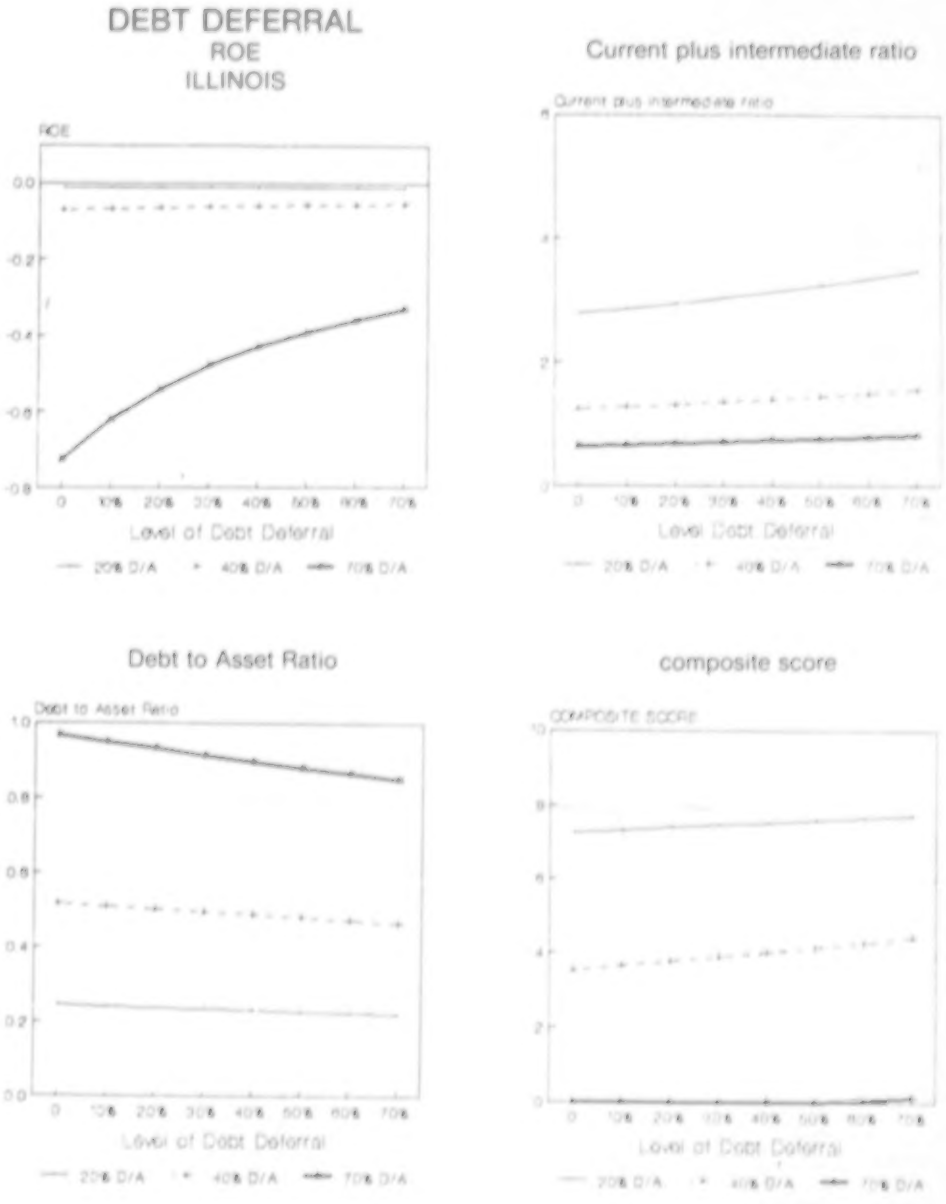


Figure 7b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Debt Deferral Strategy. *Minnesota* Simulation

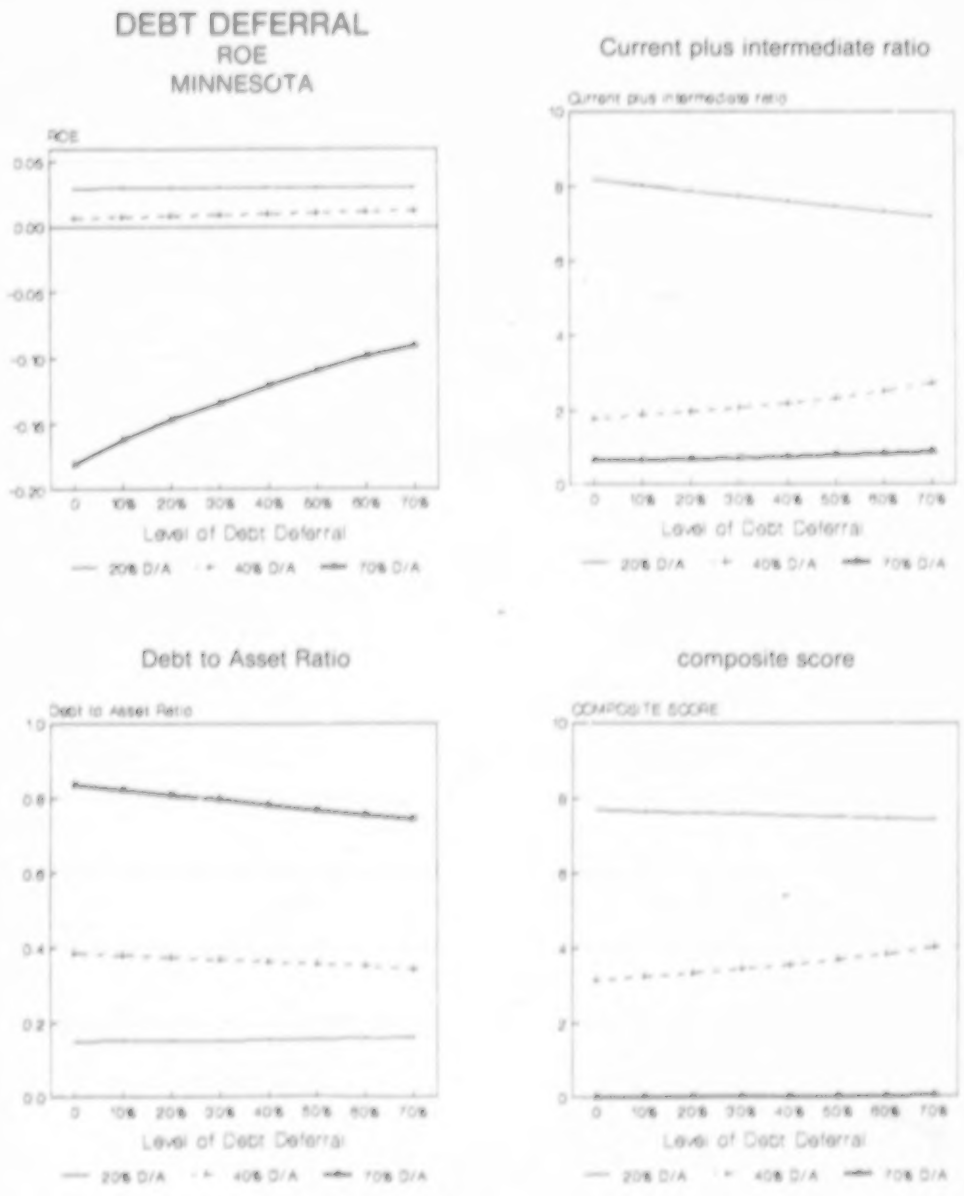


Figure 8a. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Equity Infusion Strategy. *Illinois* Simulation

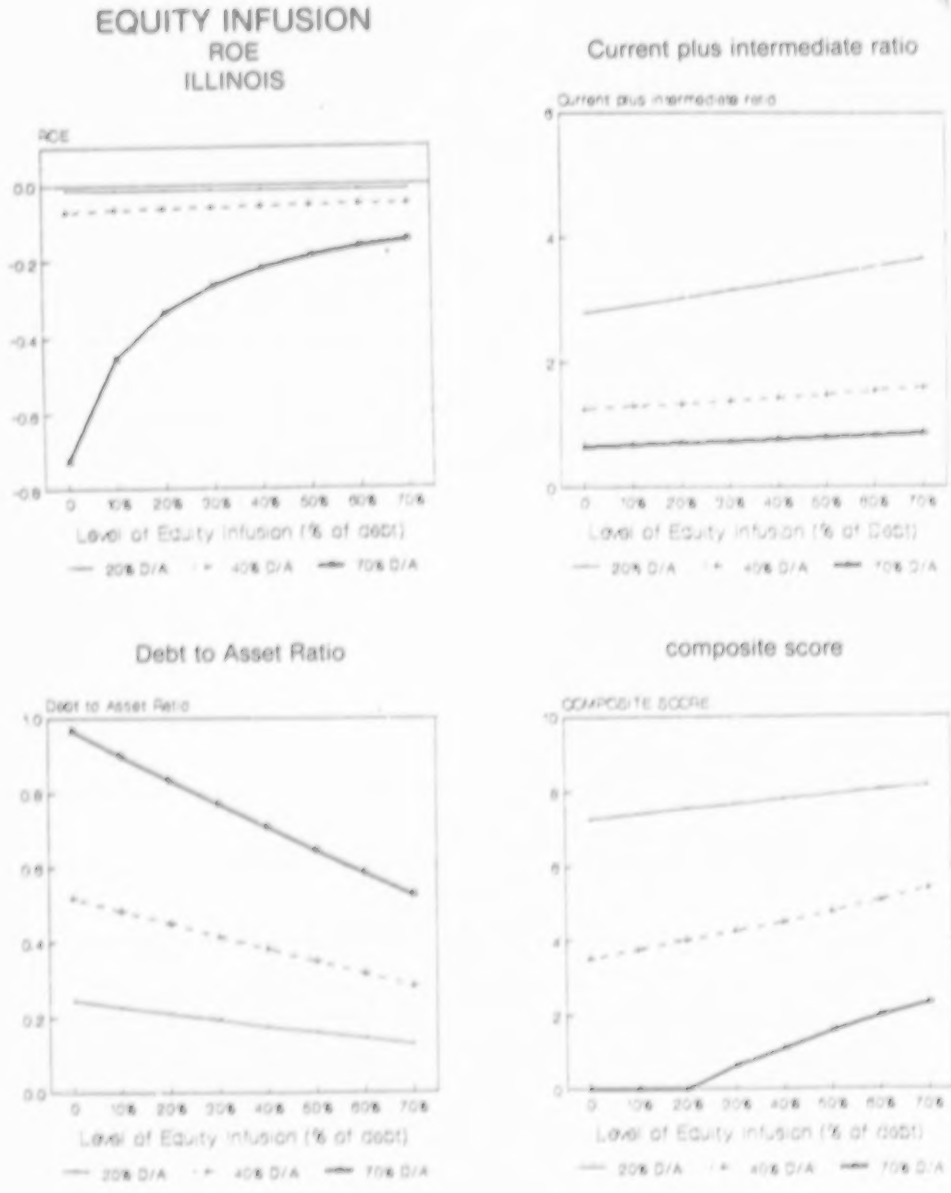
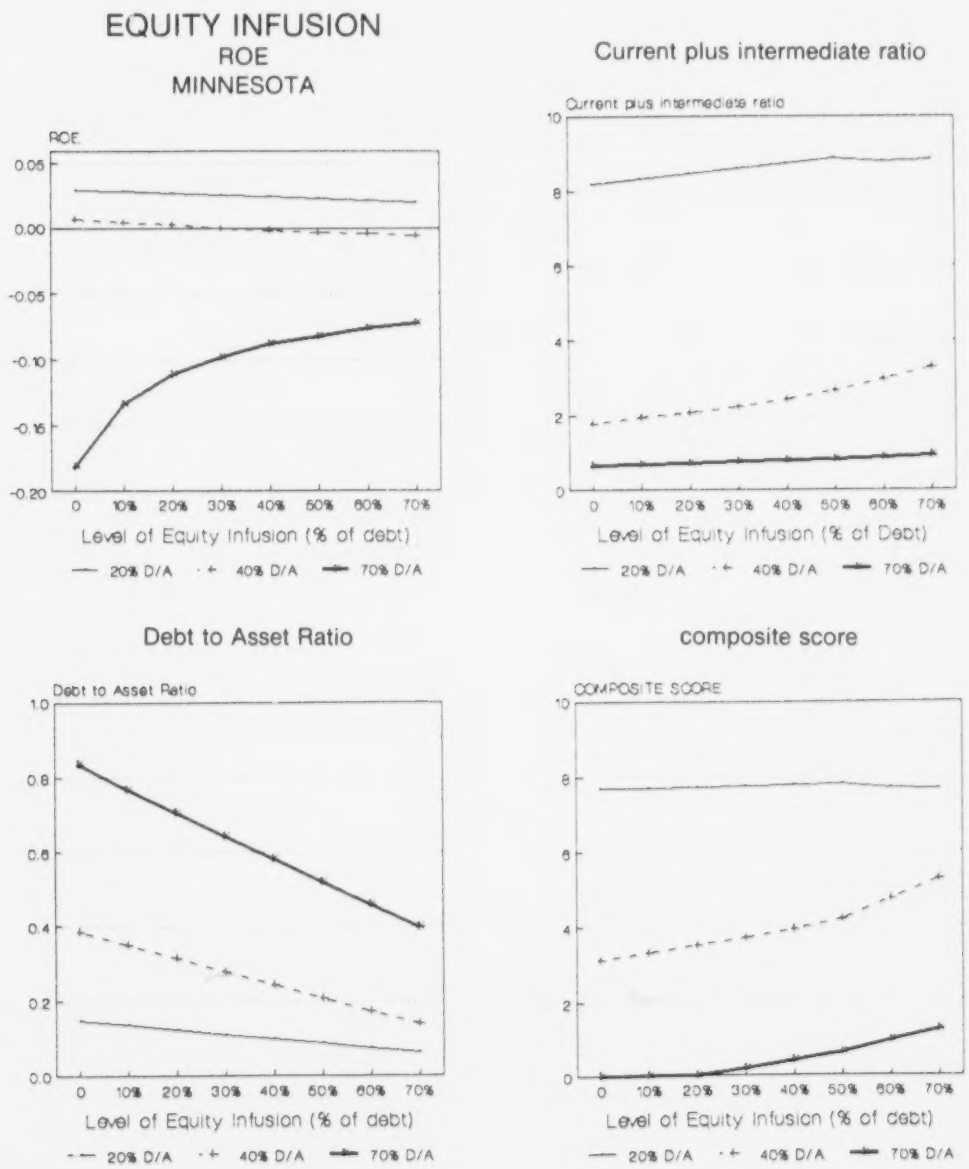


Figure 8b. Responses of Profitability, Solvency, Liquidity, and Composite Measures to Equity Infusion Strategy. *Minnesota* Simulation



discussed earlier, although the various performance measures are somewhat lower. For the farm operator, the equity infusion directly reduces leverage but still creates a financial obligation to compensate the new equity supplier at a rate that could exceed the after-tax cost of debt capital, depending on the farm's tax position, interest rates on debt, and the level of equity return. However, no retirement of the equity capital is specified that is analogous to principal payments on loans.

As Figures 8a and 8b show, the profitability effects are relatively strong for the high leverage case (although the returns on the farm operator's equity remain below zero), minimal for the medium and low leverage cases for the Illinois farm, and deteriorating for the medium and low leverage cases of the Minnesota farm. The deteriorating profitability of the Minnesota farm reflects the combined effects of relatively strong profitability in the hog enterprise and, therefore, higher marginal tax obligations, resulting in an after-tax cost of debt capital that is lower than the required rate of return on the new equity capital. In contrast, the after-tax cost of debt capital on the Illinois farm is greater than the 10 percent required return on new equity capital. The current plus intermediate ratios improve moderately for each leverage case, as do the solvency measures. The composite scores also show steady improvements, except for the low leverage case of the Minnesota farm. For both farms, an equity infusion of at least 30 percent is needed to push the composite score of the high leverage case above its lower bound. The composite scores for the medium leverage cases exceed the norms for a 60 percent equity infusion in the Illinois farm and a 70 percent equity infusion in the Minnesota farm.

Concluding Comments and Implications

In appraising the results, it is clear that the various policy options and response strategies tend to yield the stronger benefits for the farms starting in weaker financial positions. However, in most cases the benefits are not substantial enough, at least over the initial levels of implementation for the options and strategies, to enable those farms to move from their beginning leverage class to a lower one by the end of the four-year period, or to otherwise attain significantly stronger levels of financial performance. That is especially true for the farms starting in the high leverage class (i.e., 70 percent debt-to-asset ratios). The composite scores of those farms remained much below those of the lower leverage cases. In contrast, the farms starting in the medium leverage positions (i.e., 40 percent debt-to-asset ratios) appear to have greater potential for achieving and maintaining acceptable and viable financial performance, especially in the options involving asset restructuring and possible lease-back of assets.

Moreover, for some policy options, a single performance measure may show a much stronger response than the others, especially in the higher leverage cases. That was true for the response of the rate of return on equity to increases in asset returns and reductions in interest rates, as well as to reductions in indebtedness and equity infusions. Those results are consistent with finance theory in that the responses of profitability to changes in interest rates and asset returns become stronger as leverage increases. Thus, changes in interest rates and/or returns to assets may have substantial effects on near-term profitability without yielding comparable effects on the farm's overall vulnerability to risk as indicated by considerably smaller changes in solvency and liquidity. A subsequent upturn in interest rates and/or downturn in returns to assets would likely return the farm to its weaker position. That result emphasizes the need to consider the consequences of providing assistance to the financially weakest borrowers when that assistance does not significantly improve their fundamental vulnerability to risk.

The insignificant effects of the debt deferral option reflect the shortcomings of simply pushing the financial obligations ahead in time without resolving the fundamental sources of the financial problems. That response has relatively flat effects on the performance measures, leaving the farms in much the same position as they started. Perhaps the debt deferral option would be more effective if it were combined with one or more of the other options; however, the effects of jointly implemented options are not considered in the analysis.

The policy options and response strategies considered in Figures 3 through 8 are largely transition methods for buying time until the underlying causes of financial stress are resolved. For some farmers, excessive leverage is a major cause of financial stress, and for many others the restructuring of assets and liabilities is also appropriate in adjusting to a more conservative long-term financial outlook. However, the longer-term resolution of financial problems in agriculture rests with the prospects for improved profitability offered by the interplay of basic supply and demand conditions for agricultural commodities. As Figures 1a and 1b demonstrate, actions that result in sustained improvement of operating margins (i.e., higher gross revenue and/or lower operating costs) and land values may have quicker and stronger effects on the various components of financial performance than will the alternatives for restructuring and downsizing the scale of farm operations. In the final analysis, a combination of several of those actions and responses will likely be needed to restore financial viability.

The results roughly parallel those of the S-180 study in which a broader range of farm types was considered. Although the policy options improve performance for all the farms in the study, the degrees of improvement vary considerably across farms, among the options, and with the various performance measures. For the high leverage cases and some of the medium leverage cases, the prospects for improved financial conditions are dim, even with financial assistance and a more optimistic outlook for operating margins and land values. Thus, the analyses suggest the need to target the development and use of public assistance to the financial characteristics of the intended recipients. It appears that farms with relatively low leverage can survive without assistance, the highest leverage cases are only maintained in a critical situation, and the medium leverage cases have the greatest potential for benefit. However, the exceptions among the types of farms and the differences among performance measures indicate the need for a comprehensive financial analysis to determine who should be eligible for assistance.

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Appendix 1

Modeling assumptions. The commodity prices and reinvestment rates assumed in the farm simulation model are as follows:

	1986	*1987*	*1988*	*1989*
Corn ($/bu.)	2.27	1.83	1.78	1.80
Soybeans ($/bu.)	5.03	4.71	4.84	4.89
Slaughter Hogs ($/cwt.)	44.00	39.34	37.25	41.39
Marketable Securities	6.8%	7.5%	8.4%	8.7%

Participation in the feed grain program is assumed with 20 percent of the corn acreage set aside. Specific assumptions relating to each farm are summarized below.

Illinois. The simulated Illinois farm is a cash grain farm with 640 acres producing corn and soybeans. The operator owns 200 acres and leases the remaining acreage on a fifty-fifty crop share lease. The beginning asset structure of the farm is summarized as follows:

Current Assets	$ 55,730
Intermediate Assets	90,000
Fixed Assets	320,000
Total	$465,730

Land is valued at $1,500 per acre. Purchase cost for the land is $1,312. A straight amortization loan with twenty years remaining balance is assumed on the land. Land is the primary asset sold in the asset

sale scenario. A mix of land and machinery is sold through the 60 percent asset sale scenario with a grain bin being sold in addition for the 70 percent asset sale scenario.

Minnesota. The simulated Minnesota farm is a general grain and livestock farm with 320 tillable acres and a farrow-to-finish hog operation producing 96 litters per year. The operator owns 200 acres valued at $833 per acre. The remaining land is cash leased at $65 per acre. The beginning asset structure of the farm is summarized as follows:

Current Assets	$ 55,336
Intermediate Assets	47,920
Fixed Assets	244,590
Total	$347,846

Land is valued at $833 per acre with a purchase cost of $1,041. A straight amortization loan with thirteen years remaining is assumed on the land. Buildings are valued at $77,950 with 43 percent of the value in hog buildings, 45 percent in grain storage and the remaining 12 percent in machinery storage. Buildings have a cost value of $102,000 at the beginning of the horizon. For the 10 percent through 50 percent asset sale scenarios, land and machinery are the primary assets sold. In the 60 percent case, all grain storage is sold with all hogs and livestock facilities being sold in the 70 percent case.

Appendix 2

Scoring technique. A composite score for measuring financial performance of each scenario was desired. Three financial characteristics were measured—leverage, liquidity, and profitability. Each of the measures were weighted to obtain a final composite score that was used to compare results with other scenario options.

When analyzing specific ratios, there appear to be ranges that exist where improvement or deterioration of the ratio adds little to the analysis of the model. We assume a specific farm arrangement also has a normal or standard value for an individual ratio. Those attributes for analyzing ratios were used in developing the simple scoring technique.

The three ratios used in computing the composite score were the debt-to-asset ratio (D/A), current plus intermediate ratio (C+I), and return-on-equity ratio (ROE). For each variable an upper bound, norm, and lower bound were determined. The composite score was scaled between zero and ten. A score for each ratio was determined with the final score being a simple average for the three measures.

A score of five would indicate a measure equal to the norm, while a zero score indicates a result equal to or worse than the value predetermined as the lower bound for that ratio. A value of ten indicates that the outcome of that ratio was equal to or better than the value determined as the upper bound. A value between zero and five is a scaled value between the norm and worst conditions while a value between five and ten is a scaled value between the norm and best conditions.

Four outcomes could result with values obtained by the model. Following is a description of each outcome along with the calculation to obtain the score:

1. Measure is worse than the lower bound.

   Score is equal to 0.

2. Measure is better than the upper bound.

   Score is equal to 10.

3. Measure is between lower bound and the norm.

$$Score = 5 - \frac{\textit{Absolute difference between measure and norm}}{\textit{Absolute difference between lower bound and norm}} \times 5$$

4. Measure is between upper bound and the norm.

$$Score = 5 + \frac{\textit{Absolute difference between measure and norm}}{\textit{Absolute difference between upper bound and norm}} \times 5$$

Example:

	Hypothetical		
	Lower Bound	*Norm*	*Upper Bound*
Debt-to-Asset Ratio	0.80	0.30	0.10
Return on Equity	0.00	0.05	0.10
Current Plus Intermediate	0.50	3.00	6.00

Values resulting from model:

$$\begin{aligned} D/A &= 0.20 \\ ROE &= -0.05 \\ C+I &= 2.00 \end{aligned}$$

D/A score. Measure is between norm and upper so formula 4 is chosen.

$$5 + \frac{0.30 - 0.20}{0.30 - 0.10} \times 5 = 7.5$$

ROE score. Measure is lower than the lower bound causing a score of zero for ROE.

Current plus intermediate score. Formula 3 is used because measure falls between the norm and upper bound.

$$5 - \frac{3.00 - 2.00}{3.00 - 0.50} \times 5 = 3$$

Composite score.

$$\begin{aligned} D/A &= 7.50 \\ ROE &= 0.00 \\ C+I &= 3.00 \\ & 10.50 \text{ -> average} = 3.5 \end{aligned}$$

The scoring technique shows the combined level of attainment for three specific performance criteria. An objective of this study is to tract that level under various ranges of policy and economic alternatives. The trends in the score of a specific farm will be the focus rather than the comparisons between specific farms. With that objective in mind, the threshold bounds along with the norm values are determined by the simulated results of the specific farm under the specific scenarios. Using simulated results for determining the bounds gives more relevant ranges in each scenario for each specific farm case used.

Three debt-to-asset groups and six levels of simulation results for each of six policy options result in 126 separate runs made. That amount added to three runs for the base case computes to 129 total runs. The median measures for those 129 ratios were used as the norm values. The lower bound was calculated as the lowest 15 percent with the upper bound being the top 15 percent. The measures used are as follows:

Illinois

	Lower Bound	*Norm*	*Upper Bound*
C+I	0.7553	1.5984	7.1435
D/A	0.8353	0.3661	0.0969
ROE	-0.3365	-0.0394	-0.0031

Minnesota

C+I	0.8257	3.2485	10.9694
D/A	0.7032	0.2087	0.0519
ROE	-0.0832	0.0200	0.0354

Macroeconomic and Farm Commodity Policy Responses to Financial Stress

Dean W. Hughes, John B. Penson, Jr., James W. Richardson, and Dean Chen

The purpose of this paper is to identify possible impacts of alternative macroeconomic and farm commodity policies on future financial conditions in the farm sector. An exhaustive search of all policies is, of course, not possible. Alternatives have, therefore, been selected that reflect current policy debates. Where available, specific projections of numeric results are presented. In other cases, economic theory is used to suggest directions of change in economic factors and farm financial indicators.

The first section of the paper discusses possible policy goals in light of recent developments in farm financial conditions. The second section outlines the role of macroeconomic policy in changing financial conditions in the farm sector and presents projections of farm financial conditions for two monetary and fiscal policies. Farm commodity policy options and their likely impacts on financial conditions are presented in the third section. The paper ends with a short statement of conclusions.

Goals of a Farm-Oriented Policy

The directions of the policies intended to change economic conditions in the farm sector depend on policy makers' expectations of long-run equilibrium conditions for the sector. If the sector's profitability and risk are expected to be at current, or even worse, levels over extended periods of time, then government policy should focus on helping sector participants adjust to prevailing conditions. If, however, current conditions are viewed as caused by factors that are likely to change for the better, then government involvement designed to slow adjustment may well be justified.

Transition to a smaller U.S. farm sector is almost inevitable if the agricultural economy does not change (D.G. Johnson, O'Brien, S. R. Johnson, et al.; American Bankers Association). Preventing adjustment to a long-run equilibrium would be extremely expensive to taxpayers or consumers. Thus, such a policy is unlikely to sustain needed political support. Moreover, government programs designed to isolate the sector may be removed suddenly, possibly causing more damage than they were originally designed to prevent. With the expectation of the indefinite continuation of current conditions, government responses should probably be constrained to those that ease transition of resources out of the sector.

Government responses could be quite different if conditions can be expected to improve. Based on historic perspective, current conditions are extremely unusual. The average profitability of the farm sector for 1980 through 1984 was lower than any time since the mid-1920s (Hughes and Osborn). In addition, fluctuations in real net farm income have increased dramatically since 1970 (Gabriel). Thus, it is quite possible that current conditions are worse than should be expected for farmers in the long run. If so, slowing the current rapid disinvestment in the farm sector may well reduce the need for rapid investment in the future, which almost certainly would be accompanied by higher food prices.

Which direction should farm policies take? The answer to this quandry for policy makers lies in identifying the causes of current

Dean W. Hughes is an associate professor at Texas Tech University. John B. Penson, Jr., James W. Richardson, and Dean Chen are professors at Texas A&M University.
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problems in the farm sector. It is then up to the policy maker to decide if the fundamental forces causing current farm problems are themselves at long-run sustainable levels. If they are, then little change should be expected for farmers. If, however, important causes of current farm problems are unsustainable, then consideration should be given to controlling farm sector adjustments.

Herein lies the major division for the rest of this paper. Macroeconomic policies will henceforth be viewed as forces that have been at least partially responsible for current farm problems. It is expected that farmers will not find the political power base required to force adjustments in overall fiscal or monetary policies and must, therefore, treat general economic conditions as given. Farm commodity and credit policies could, however, be changed to either aid transition to current conditions or be used to slow disinvestment in the farm sector.

The Influence of Macroeconomic Policies

Macroeconomic policies are generally divided into two main categories, monetary policy and fiscal policy. Monetary policy is the control of the growth of money and credit in the economy as designed and implemented by the Federal Reserve System through authorization by Congress. Fiscal policies are the actions of government in spending and raising tax revenues. Fiscal policy influences total economic activity through the impacts of total government expenditures and tax receipts. It also influences individual markets through decisions regarding what the government will buy and what it will tax. As such, farm policy is a component of fiscal policy, but will be considered as separate in this paper given its significantly different objectives from other parts of the federal budget.

Impacts of Individual Policies on the General Economy

With the exception of specific farm policies, macroeconomic policies cause indirect changes in the financial condition of farmers. Fiscal and monetary policies have their major impact on general economic conditions such as the rate of growth of gross national product (y), the rate of inflation (P), the real interest rate (r), and the real exchange rate (x). Those changes concurrently interact with the agricultural economy. There is not, and may never be, agreement on the part of economists as to how macroeconomic policies affect the overall economy, particularly when the distinction between short-run impacts and long-run impacts is made. Thus, the assumptions used for this study are described in Figures 1 through 4.[1]

Figures 1 and 2 show the assumed short- and long-run responses of the general economy to more expansionary fiscal and monetary policies. In most cases, the responses are similar to those presented in most macroeconomic textbooks (Samuelson; Branson). There are a few exceptions, however. In Figure 1, inflation is assumed to respond more rapidly to changes in the money supply than to changes in fiscal policy. Perhaps more debatable, and of more consequence to later findings in this section, is the negative long-run response in GNP to stimulative government policies. That response is the logical result of assuming that there are real costs of inflation (Hughes). After all, if there are no costs of inflation, why does the public repeatedly bear the real costs of unemployment and lower incomes to reduce inflation?

Figure 1. Direction of Change of General Economic Variables in the Short Run for a More Stimulative Macroeconomic Policy

Policy	y	P	r	x
Fiscal	+	–	+	+
Monetary	+	+	–	–

+ implies increase, – implies decrease, and · implies little change

[1]The reactions of gross national product, real interest rates, and the inflation rate in Figures 1 through 4 can be developed graphically in an IS-LM, aggregate demand, and aggregate supply framework. Contrary to some opinions, such a framework can be used to present the Keynesian, the Monetarist, and the Supply-side models since the loci represent equilibriums of different variables regardless of the underlying equations. Some may even notice that this paper is not particularly Keynesian in that it does Friedman one better by suggesting a backward bending long-run aggregate supply curve.

Figure 2. Direction of Change of General Economic Variables in the Long Run for a More Stimulative Macroeconomic Policy

Policy	y	P	r	x
Fiscal	–	+	+	+
Monetary	–	+	–	–

+ implies increase, – implies decrease, and ~ implies little change

Over the long run it is hypothesized that the continued use of stimulative government policies increases the rate of inflation and decreases growth in the economy through the misallocation of resources used in adjusting to inflation. Thus, not only is government stimulation of the economy assumed to be impotent over the long run, it is expected to be counterproductive. Finally, the real exchange rate is assumed to be more sensitive to changes in domestic real interest rates than in domestic real incomes. Higher interest rates are expected to cause a greater foreign demand for U.S. dollar-denominated assets, a greater demand for U.S. dollars, and a higher U.S. exchange rate (Schuh).

Impacts of Joint Policies on the General Economy

While Figures 1 and 2 are needed for explanatory purposes, they do not capture the intricacies of analyzing changes in macroeconomic policies. History shows very few instances when only one type of government policy changed over a particular period of time. Both policies are constantly changing, so Figures 3 and 4 illustrate the very least required to discuss how macroeconomic policies affect the economy and farmers while all else is assumed to remain the same.

Figure 3. Direction of Change of General Economic Variables in the Short Run for Combinations of Changes in Macroeconomic Policies

Policy					
Fiscal	*Monetary*	y	P	r	x
+	+	+	+	~	~
+	–	~	~	+	+
–	+	~	~	–	–
–	–	–	–	~	~

+ implies increase, – implies decrease, ~ implies little change

Figure 4. Direction of Change of General Economic Variables in the Long Run for Combinations of Changes in Macroeconomic Policies

Policy					
Fiscal	*Monetary*	y	P	r	x
+	+	~	+	+	+
+	–	–	+	+	+
–	+	+	–	–	–
–	–	+	–	–	–

+ implies increase, – implies decrease, ~ implies little change

Note that there are two general types of policy combinations presented in Figures 3 and 4. Either fiscal and monetary policies work together in expanding or contracting economic activity, or they are at odds with one another. When they work together they produce strong changes in output with little-to-no short-run change in interest and exchange rates. When fiscal and monetary policies are set against each other, there may be little change in economic activity but strong changes in interest and exchange rates. Thus, when opposing changes occur in fiscal and monetary policies it is the composition, not the overall size, of the economy that changes.

Take, for example, a situation where fiscal policy is expansionary while monetary policy is restrictive. Given such a situation, one could only base short-run projections of growth in the economy on the relative strengths of the two policies. If the impact of fiscal policy is greater than that of monetary policy, GNP will grow. If the impact of monetary policy is greater, GNP will decline. Or, if the two policy changes have about the same impacts, there may be little change in GNP. There would likely be, however, a substantial increase in interest and exchange rates. The Treasury would increase borrowing at a time when growth in the supply of money and credit is being reduced by the Federal Reserve System. Such a policy would, therefore, decrease the profitability of sectors of the economy that are capital intensive or sensitive to exports, while stimulating other sectors so as to leave the change in total output indeterminant.

Two additional observations should be made before moving on to the discussion of how those general economic outcomes affect the farm sector. First, the reactions of the

economy in the short run are not the same as they are in the long run. That is in large part due to the costs-of-inflation argument discussed above. In the short run, expansionary government policies working in tandem can increase economic activity. After inflation becomes anticipated, however, such stimuli become counterproductive with higher levels of inflation leading to lower rates of growth. The other observation is that more impacts are determinant in the long run than in the short run. In the long run, when the two policies oppose one another, there is an interaction among real interest rates, investment, the accumulated capital stock, and the supply of goods and services in the economy. For example, prolonged periods of high real interest rates will eventually lead to a smaller capital stock, slower growth in supply, slower growth of incomes, and more inflation. Finally, even when the two policies cooperate, in the long run they generate changes in interest rates, unless there is a very strong real wealth effect.

Impacts of Macroeconomic Policies on Farm Financial Conditions

The next step is to link changes in the general economy to changes in financial conditions in the farm sector. Two dimensions of financial conditions will be considered: profitability and risk. Real net farm income will be used as a measure of profitability. Real wealth (or net worth) is used to measure solvency and thus serves as an indicator of the riskiness of providing capital to the farm sector.

Figure 5 presents the assumed relationships between those two measures and changes in general economic conditions in the short run and in the long run. Higher domestic income levels are expected to boost farmers' incomes by increasing the demand for food. Higher total incomes improve farmers' net worth by increasing the profitability of the sector and the demand for farm land by non-operator landlords and land developers.

There is a growing body of evidence (Chambers; Bessler) that indicates that farm commodity prices are more quickly influenced by growing inflation than other prices. In the short run, increasing inflation is, therefore, expected to increase farm income. However, other studies have shown

Figure 5. Direction of Change of Farm Financial Indicators to Increases in General Economic Variables

General Indicator	*Farm Indicator*			
	Net Farm Income		Farmers' Net Worth	
	SR	LR	SR	LR
y	+	+	+	+
P	+	–	+	+
r	–	–	–	–
x	–	–	–	–

+ implies increase, – implies decrease

that the ratio of prices received to prices paid as well as borrowing capacity decline over longer periods of inflation (Tweeten; Lins and Duncan; Klinefelter, et al.). Thus, the "cost price squeeze" during the late 1970s may well provide evidence that current returns to farms are decreased in the long run by sustained inflation. Real farm land values, however, tend to grow with higher rates of inflation due both to higher profits in the short run and to a portfolio shift to real assets by all consumers in the long run. At the same time, any fixed interest rate debt that might still exist in the farm sector shrinks in value. Higher inflation is expected to lead to an increase in farmers' wealth in both the short and long runs.

Higher real interest and exchange rates are not expected to be good for farmers' incomes or wealth over any time period. Higher real interest rates increase production expenses and can reduce domestic demand for food as food budgets are squeezed by higher house and car payments. In addition to reducing profits, higher real interest rates increase the discount factor in determining current asset values and play a double role in decreasing farmers' wealth. Finally, higher real exchange rates reduce foreign demand for U.S. farm commodities and increase food imports.

Figures 6 and 7 show the linkage between different macroeconomic policies and changes in farmers' incomes and wealth. All signed factors influence farmers' financial conditions in the same way over the short run, suggesting reasonably strong macroeconomic influences on the conditions of farmers. Either stimulating the economy through joint efforts of fiscal and monetary policy or reducing interest rates by reducing the deficit while easing monetary policy would likely result in a short-run

improvement for farmers. The other choices, either increasing the deficit and tightening monetary policy or sending the economy into recession by contracting fiscal and monetary policy at the same time, would tend to hurt farmers.

Reactions over the long run are the opposite of those in the short-run cases where fiscal and monetary policies act together. When both stimulate the economy they lead to higher rates of inflation, slower growth in income, and somewhat higher interest and exchange rates. That would likely decrease farm incomes and probably reduce farmers' wealth, even with the inflation-induced shift toward real assets. Conversely, reduced deficits and slower growth in money would likely lead to better long-run equilibrium conditions for farmers (Hughes, Richardson, and Rister).

Figure 6. Short-Run Impacts of Macroeconomic Policy Combinations on Farmers' Income and Wealth

Policy		*General Economy*				*Farm Economy*	
Fiscal	Monetary	y	P	r	x	Income	Wealth
+	+	+	+	–	–	+	+
+	–	–	–	+	+	–	–
–	+	–	+	–	–	+	+
–	–	–	–	–	–	–	–

+ implies increase, – implies decrease, and – implies little change

Figure 7. Long-Run Impacts of Macroeconomic Policy Combinations on Farmers' Income and Wealth

Policy		*General Economy*				*Farm Economy*	
Fiscal	Monetary	y	P	r	x	Income	Wealth
+	+	–	+	+	+	–	–(?)
+	–	–	+	+	+	–	–(?)
–	+	+	–	–	–	+	+(?)
–	–	+	–	–	–	+	+(?)

+ implies increase, – implies decrease, and ? signifies opposing impact of inflation on land prices versus all other impacts

Projections of Macroeconomic Conditions to 1990

There are an enormous number of empirical questions embedded in the preceding theoretical discussion. Moreover, conclusions often times depend on the relative size of the changes in macroeconomic policies and initial conditions in the economy. It is, therefore, necessary to quantify assumptions regarding alternative macroeconomic policies and to use models to generate consistent implications for changes in farm financial conditions.

The following results were developed with COMGEM, a commodity specific general equilibrium model of the U.S. economy that focuses on agriculture (Penson, Hughes, and Romain). The model was used to project possible future changes in farm financial conditions assuming two different macroeconomic policies from 1987 to 1990. The projection horizon stopped at the end of 1990 since that is the specified expiration date of the 1985 Food Security Act.

The first scenario assumes a continuation of current macroeconomic policies that can be characterized as including large government deficits and rapid expansion of the money supply. Even with the Gramm-Rudman-Hollings amendment in effect, the budget deficit is expected to grow to between $220 and $225 billion in 1986 compared to $197 billion in 1985. And the monetary base—currency and bank reserves—grew 7.9 percent from October 1985 through October 1986 (Federal Reserve Bank of St. Louis). The second scenario has been developed assuming a slow reduction of the federal deficit and slower growth in money starting in 1987. In that scenario, government expenditures are assumed to grow no faster than inflation, tax rates are increased by two percent (not two percentage points) per year and growth in base money is set at 3.75 percent per year. Both scenarios described in this section assume a continuation of the 1985 Food Security Act through 1990.

The implications of the two macroeconomic policies for the rate of growth in GNP, the inflation rate as measured by the rate of change in the GNP deflator, and the real prime interest rate are graphed in Figures 8, 9, and 10. Results are consistent with economic theory. The continued fiscal and monetary stimulus assumed in the first scenario generates accelerating growth in GNP and inflation. As actual inflation grows, it at first surprises savers and generates low real interest rates. As higher levels of inflation become anticipated, however, real interest rates rise to clear financial markets serving large government and private demands for funds. When fiscal and monetary stimuli are reduced, as assumed in

Figure 8. Percent Changes in Real Gross National Product: 1984–90

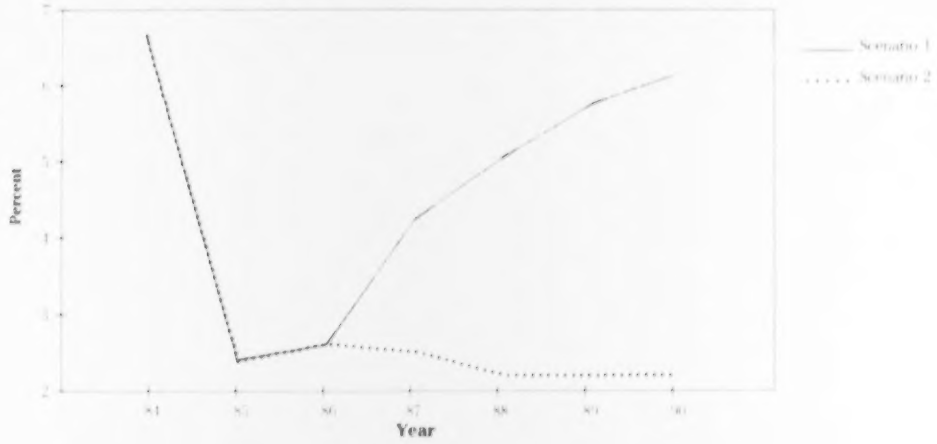


Figure 9. Percent Changes in Gross National Product Deflator: 1984–90

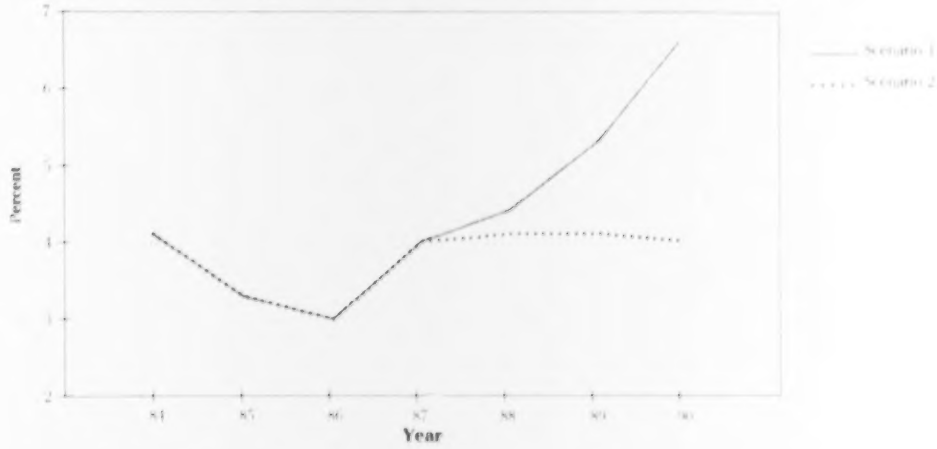
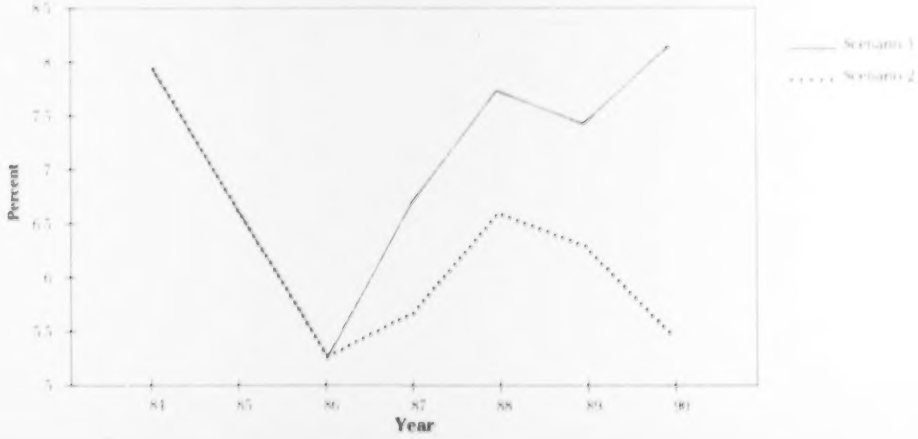


Figure 10. Real Prime Interest Rate: 1984–90



the second scenario, growth in GNP and inflation are lower than in the first scenario. Real interest rates are also slightly lower in the second scenario. Basically, the reduction in demand for credit by the government and private businesses is found to be greater than the reduction in supply caused by tightening monetary policy.

Implications of the alternative macroeconomic policies for the farm sector are presented in Figures 11, 12, and 13. Figure 11 shows the two paths of net farm income deflated by the GNP deflator with a 1967 base. Real farm asset values are graphed in Figure 12, also in 1967 dollars. And the sector's debt-to-asset ratio is presented in Figure 13.

Continuing current policies generates growing problems for farmers. Theory suggests that easing monetary policy, as assumed in the first scenario, should provide some short-run relief for farmers. Projections for the first scenario, however, show little benefit to farmers of such a change at this time. Real farm income is projected to stay low and show no discernible trend through 1990. The real value of farm assets declines throughout the period. And, the sector's debt-to-asset ratio declines slowly. The primary reason for the difference between the model results and the theoretical discussion lies in recent changes in farm policy. One major component of the 1985 Farm Bill is the sale of large existing stocks of major crops. In the first scenario, the price declines associated with those sales offset any short-run advantages for farm income that might have been gained by an easier monetary policy. A return to rapid growth in GNP and an inflationary environment for farmers could slow, but probably not reverse, recent rapid declines in the financial condition of farmers.

Choosing less stimulative fiscal and monetary policies is expected to benefit farmers in the long run. Such benefits are evident in the projected trends developing late in the 1980s in scenario two. Real net farm income may be more than 20 percent higher by 1990 if fiscal and monetary policies are constrained. In that scenario, real farm asset values bottom out in 1989 and increase slightly in 1990. The sector's debt-to-asset ratio declines with greater internal financing and rising asset values.

Macroeconomic policy is a major determinant of long-run equilibrium conditions in the farm sector. If large government deficits are to continue and growth in money and credit remains high, it is unlikely that farming will return to a "normal" level of profitability. If, however, economic and political forces exist, or will develop, that force control of federal deficits and constraints on monetary growth, then the future of farming is likely to be better than current circumstances suggest.

Influence of Farm Price and Income Support Policies

Farm price and income support policies have been implemented in a variety of ways over the post-World War II period. Prior to the 1970s, farm incomes were supported indirectly through programs designed to raise prices of specific commodities. They included nonrecourse loan programs, commodity purchase programs, storage programs, and production and marketing control programs. During the 1970s, emphasis was placed upon supporting farm incomes directly through target price programs. While that allowed the government to support incomes without establishing a price floor substantially above market equilibrium levels, CCC loan rates increased for most major commodities over the 1970–83 period before being modestly reduced in 1984 and 1985.

The Food Security Act of 1985 was enacted in an environment where between one-fourth to one-third of the nation's producers were in serious financial difficulty. One of the main features of the act is the systematic reduction in Commodity Credit Corporation (CCC) loan rates over the remainder of the decade, a move designed to make the sector more responsive to world market conditions. Loan rates for wheat, feed grains, and cotton were reduced sharply. The act stipulates that loan rates be set at 75 percent of the average annual market price over the previous five-year period (dropping the high and the low), but not falling by more than five percent in any one year. Target prices are to remain at 1984 levels until 1988, when they are scheduled to decline as well.

The 1985 act provides a greater role for markets in determining resource use and income in the farm sector. It also makes U.S.

Figure 11. Real Net Farm Income: 1984–90

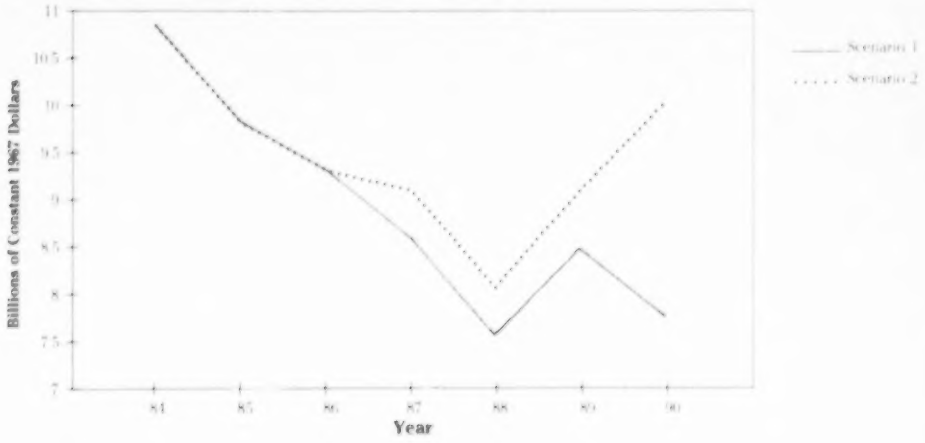


Figure 12. Real Farm Asset Values: 1984–90

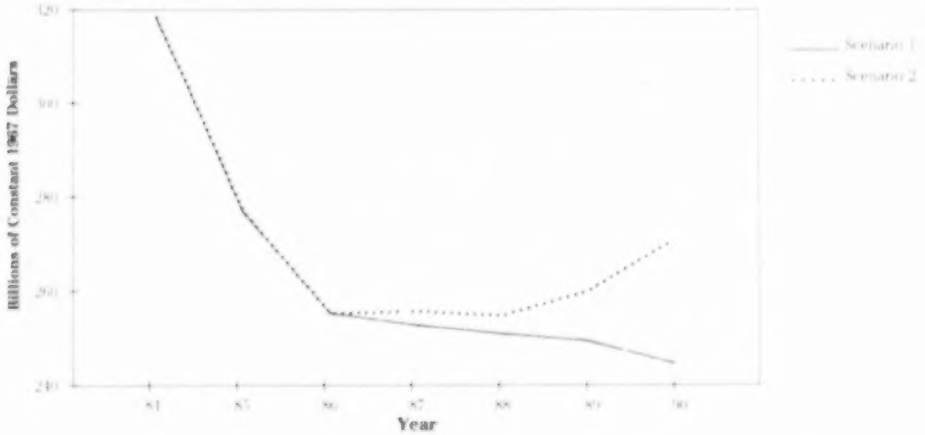
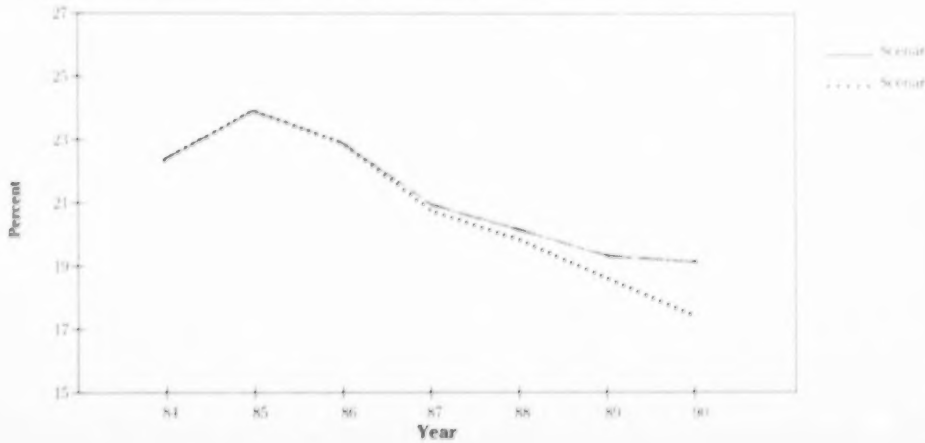


Figure 13. Farm Debt-to-Asset Ratio: 1984–90



farm products more competitive in the world market as a result of the significant reduction in base loan rates and an active marketing loan program. Despite skepticism over the act, there are some early indications of positive results; exports of such major crops as wheat, cotton, and soybeans have already increased sharply.

Linkages to Farm Financial Conditions

Farm price and income support policies have direct and indirect effects on financial conditions in the farm sector. The immediate direct impacts of supporting farm commodity prices above market clearing levels are to increase revenues and incomes. Even those direct effects are offset to some extent, however, by the costs involved in participating in farm programs. For example, cash receipts from 1986 crop marketings are expected to be approximately $10 billion below those of 1985. That decline is due to lower prices and reduced acreage for government set asides and conservation efforts. Thus, while the $13 billion of anticipated government payments to participating producers in 1986 will have a significant influence on current farm financial conditions, it is not as large as its absolute size suggests. Over the long run, more indirect effects become apparent. Higher incomes increase investment, input prices, and production. Greater supplies eventually lead to ever-increasing government expenditures or a period of low incomes.

There are many financial impli .tions of planned cutbacks in current levels of support for farm income under the 1985 act. Lower loan rates will likely generate significantly lower prices for farmers who do not participate in government programs. Declining target prices will have important distributional implications unless world market conditions improve. Moderate-sized farms will likely suffer more from cutbacks in target price programs than large-sized farms which are generally more efficient and can better cope with risk. Small farms will also be less affected given their owners' access to other income sources. Highly leveraged farms could experience additional pressure to remain solvent and probably would not survive. Farm lenders will probably experience additional stress as the ability of farmers to repay their loans deteriorates and as farm land values fall below already low levels. And declining economic activity in the farm and farm-related economies would almost certainly mean greater stress on the economic base of many rural communities.

Linkages to Other Policy Decisions

There seem to be three conflicting goals of farm policy today, due in part to the reduced isolation of rural America. One goal is to slow disinvestment in the farm sector. Even those who do not believe in a return to the conditions that led the U.S. Department of Agriculture (USDA) to devote its 1981 yearbook to *Will There Be Enough Food?*, probably would want to prevent asset markets from overcorrecting and generating unsustainably low prices.

The transitional nature of the 1985 act underscores the need for farm policy to be consistent with other national policy goals. One such national goal, which is playing a large role in current farm policy debates, is the frequently stated objective of reducing federal budget deficits. Controlling the deficit, or at least creating a climate where it is no more difficult to control, has therefore become another goal of farm policy. The immediate impact of the 1985 Farm Bill has been to increase government payments to farmers. Yet, lower target prices and reduced government stocks of farm commodities are expected to eventually reduce such expenditures.

Finally, another major goal of the 1985 act is to make agriculture more responsive to world market conditions and curb foreign expansion. A protectionist climate, which could resurface in the coming session of the 100th Congress, may call that goal into question. Such a climate may be short-lived, however, as its repercussions are more generally recognized. For example, corn producers felt the "feedback" effects of protectionist legislation in early November when Canada levied a substantial countervailing duty on corn imported from the U.S. That action by the Canadian government seemed to be in response to the tariff levied by the U.S. on imports of shingles and other soft lumber products earlier this year. Moreover, the long-run problems with having the U.S. unilaterally support world farm commodity prices are now widely recognized.

As alternative farm income and macroeconomic and international trade policy proposals are evaluated, it is important to understand their ultimate impact on financial conditions in the farm sector. It is also important to note that in almost all cases the proposals tend to support one or more of the general goals of farm policy makers. Different weights placed on each goal generate substantially different results for U.S. farmers, taxpayers, and consumers, however.

Implications of 1985 Food Security Act

The continuation of existing farm income support and macroeconomic policies will require record levels of direct government expenditures just to maintain nominal net farm incomes in the $25 to $30 billion range over the remainder of the decade. Under the first macroeconomic (high deficit) scenario, total direct government payments to producers would total $76 billion over the five-year period beginning in 1986. Crop producers would experience additional financial stress due to falling crop prices during 1986–88 as CCC loan rates are cut and expenses remain high due to continuing high farm sector interest rates. Total direct government payments to producers would decline modestly toward the end of the decade in response to two factors. First, there would likely be an increase in domestic and export demand, putting some upward pressure on nominal commodity prices in 1989–90. And second, target prices would decline as scheduled. Stock carryouts for wheat and feed grains by the end of the decade would be down slightly from their peaks in 1988, but would not be appreciably different from 1985 levels. Livestock producers would likely fare relatively well over the 1987–90 period under that scenario due to declines in real crop prices and a rapidly expanding general economy.

The adoption of the more restrictive fiscal policies assumed in the second macroeconomic (declining deficit) scenario would lead to lower farm interest rates and expanded farm exports sales. Crop producers would fare better under that scenario, while livestock producers would feel the effects of slower growth in incomes and higher real crop prices late in the decade. Direct government payments to producers would be somewhat lower than they were under the first scenario due to higher crop prices. Although producers in general would be in a stronger financial position and government costs would be less, improvement under that scenario would not be enough to save most highly leveraged producers.

Continuation of the 1985 act through 1990—despite a mounting cost to the U.S. Treasury—is not likely to provide significant relief to farmers experiencing financial stress. Those policies appear to merely provide a means of smoothing the transition to a smaller U.S. farm sector by the end of the decade. The adoption of fiscal policies that reduce annual federal budget deficits (without altering direct government payments to farmers) would provide some relief, but would still leave producers in a weaker financial position than they were in 1980.

Alternative Farm Policy Options

Given the different weights placed on the goals of farm policy by different groups, it is expected that the 100th Congress will reopen debate on farm legislation in 1987. Of the alternative farm policies that have been discussed, the following have received considerable interest: Harkin-Gephardt proposal, mandatory supply controls, supports on domestic production, reductions in target prices, and extension of marketing loan concept. Each will be discussed with respect to its impact on: production, stock carryouts, prices, incomes, asset values, and farm financial conditions. Greatest attention is given to the Harkin-Gephardt proposal because it may be the centerpiece for debate in 1987.

The Harkin-Gephardt proposal calls for a mandatory set aside of up to 35 percent of crop land, and in return, offers producers price supports equal to 70 percent of parity. A targeted set aside would be used; it would increase, based upon farm size, to a maximum of 35 percent for "large" farms. Target prices would be eliminated by the use of support prices set at 5 to 10 percent above current target prices. Marketing certificates would restrict the quantity of a commodity that producers can market. Production in excess of the marketing certificate may be used on the farm, a particularly beneficial provision for Midwest grain-livestock farmers. An export PIK is included in the proposal to assure that the U.S. maintains its traditional share of the

export market. That final provision gives the Harkin-Gephardt proposal the ability to back the U.S. into separate domestic and export prices.

The Harkin-Gephardt proposal also seeks to reduce crop production levels in line with total demand and thus would have little effect on overall stock carryout levels. Domestic market prices might immediately increase to the support price set at 70 percent of parity, thus necessitating extensive use of export subsidies to maintain export market shares. A cost to the U.S. Treasury of as much as $10.5 to $11 billion in export subsidies and storage costs for grains and cotton could be expected for 1988. While crop producers would experience higher net incomes, livestock producers would receive lower incomes as the price of feed grains climbs (corn prices could increase to $3.60 in 1988 and to about $4.20 in 1990). Higher farm incomes for crop producers would gradually increase crop land prices, but probably not in time to save many highly leveraged producers. Lower farm incomes for livestock producers may result in increased financial stress being experienced by livestock producers and feeders. Moreover, domestic consumers could be expected to pay higher food prices under the proposal.

While the Harkin-Gephardt proposal would at first glance seem to satisfy all three of the current goals of farm policy, a closer look suggests that is not the case. Government cash costs would likely be lower, but much of the reduction would be made up by drawing down government assets through PIK payments for export subsidies. The rest of the hypothetical savings of the proposal would come in higher food prices for consumers, which would violate a principle of farm policy making older and more critical than the three discussed above.

Mandatory supply controls, along the lines of the 1986 nonbinding wheat referendum, have also received considerable attention in Congress. Prices for program crops would be supported at 125 percent of the cost of production (excluding land and residual returns to management). Strict marketing controls (quotas) imposed to equate supply with domestic demand would be required to avoid massive stock buildups at those levels of support. Current high levels of grain stocks could be reduced by issuing fewer marketing certificates than necessary to meet domestic demands or using an export PIK in the first few years of the program. Approximately 40 percent of the land devoted to wheat, feed grains, cotton and rice could be idled under such a program as exports of those commodities would likely fall to near zero in the absence of export subsidies. In fact, stringent import controls would probably be needed to keep out cheap foreign grains. Higher crop prices would not necessarily assure a higher total income for crop farmers because of the loss of deficiency payments on land in production and total incomes on idled land. Incomes for livestock producers would almost certainly fall due to higher grain prices. Asset values on livestock farms would fall, as would the value of crop land not having a quota. Crop land having a quota, however, would probably experience an increase in value if the quota is tied to the land.

Overall, in the name of slower disinvestment in the farm sector, mandatory supply controls used to limit supply to meet domestic demand would likely decrease farm incomes and asset values in addition to losing foreign markets for U.S. agricultural products. The proposal will probably not save highly leveraged producers. Mandatory supply controls may even worsen the farm financial crisis as income and asset values in the livestock sector decline.

Supports for domestic production have been suggested as a means of reducing government costs associated with the farm program. Under that proposal, farmers would receive income and price supports, at current levels, on only the portion of their crop used in the domestic market. Treasury outlays would be reduced by providing deficiency payments and price supports on only the domestic portion of production. The remainder of the production would be sold on the export market at the world price. Producers would receive a blended price based upon the portion of the crop sold domestically at the support price and the portion exported at the world price. A marketing board or some other regulatory agency would be required to ensure that producers receive a blended price.

Net farm income for crop producers would likely decline relative to the 1985 act if

deficiency payments are reduced and producers receive a blend of domestic and world prices for their crops. Livestock producers could also experience lower net incomes as they are forced to pay higher prices for domestic grains. There would have to be import controls on grains to keep livestock producers from using cheaper foreign products. And, as foreign production of meat proved more profitable, controls would need to be strengthened on meat imports. Asset values would likely decline as net incomes for both crop and livestock producers fall below their levels established by the 1985 act. The farm financial crisis therefore would likely worsen by switching to a program that provides price and income supports for only the domestic share of production.

Reducing target prices to lower the U.S. Treasury cost of farm programs has been suggested. Such a policy would obviously put the greatest weight on balancing the budget at the cost of forcing the sector to rapidly adjust to current conditions. Those proposals would decrease target prices 10 to 25 percent in addition to the reduction scheduled by the 1985 act. Stocks would decline to the extent that production is reduced in response to lower target prices. Lower target prices would likely reduce net farm income for crop producers and thus reduce asset values devoted to program crops. Livestock producers' incomes would, for the most part, be unaffected by the proposal. The farm financial crisis could be made worse by the negative effects that target price reductions would have upon crop producers' incomes and asset values.

Extending the marketing loan to wheat and feed grains is possible under the provisions of the 1985 act. Marketing loan programs for cotton and rice have largely removed the burdensome level of stocks from the market place. Such a program for grains would be costly to the U.S. Treasury but would remove surplus stocks in a short time. Domestic grain prices would fall, aiding livestock producers in the short run. Net incomes of crop producers would remain about the same in the short run due to maintenance of target prices and set aside rates at their 1985 act levels. Asset values for crop producers would not be affected in the short run but range land values might improve. Hence, such a policy trades large increases in government expenditures for marginal short-run improvements and questionable long-run implications.

Each of the alternative farm policies has some merit. They all seem to move toward seemingly legitimate, if contradictory, policy goals. However, none has the ability to alleviate the farm financial crisis by itself without more government support for farmers than seems to be politically available. Most policies that have potential for aiding crop producers would increase the farm financial crisis facing highly leveraged livestock producers. Furthermore, if farm price and income policies were to be enhanced to the point where they eliminated the financial stress of the one-fourth to one-third of the nation's farmers experiencing the most stress, U.S. farm commodities would likely be priced out of world markets or create massive surplus stock problems.

Summary and Conclusions

Government policy makers face an almost unlimited number of choices in how to react to financial problems in the farm sector. Suggested policy options range from changes in monetary and fiscal policies to targeted financial relief for specific farmers. All such options have their proponents, and of course, actual changes in legislation will be a blend of what is economically reasonable and what is politically feasible.

Farm commodity policy is changing rapidly. Less than one year ago one of the most widely debated pieces of farm legislation in history was passed. Yet, there is currently serious discussion of making major changes in the law, if not starting on completely new legislation. Part of the problem lies in an underlying disagreement regarding the long-run equilibrium for the farm sector. Those who anticipate a continuation of current conditions argue strongly for government policies limited to easing transition to a smaller farming sector. Those who think conditions are unusually poor also have strong arguments—for a more active government role to smooth cyclical behavior and perhaps stop adjustment.

Another problem facing policy makers is an internal inconsistency in three current goals.

Disagreement about future conditions has led to a compromise goal of slowing the transition to a smaller sector, that is, slowing disinvestment. Another widely shared goal is the desire to be competitive in international agricultural markets. Finally, farm policy makers share in the national goal to reduce federal budget deficits. At most, two of those goals can be achieved so it is possible to discredit any policy proposal by simply pointing to the goal that is being overlooked. It is, therefore, unlikely that a particular farm policy will be able to solve the problems of highly leveraged producers.

What is needed is the elimination of one of the inconsistent goals and a resolution of the questions regarding long-run equilibrium in the sector. Such answers cannot come before the implementation of a sustainable set of macroeconomic policies, particularly fiscal policy. Lower deficits would resolve many problems for farmers and farm policy makers. Long-run expectations of profitability would improve and resources would be available to pursue farm policy goals. Until deficits are controlled, farm policies are therefore likely to remain in a state of almost constant flux, adding to the risks of investing in the farm sector and complicating farmers' efforts to cope with current financial stress.

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Federal Income Tax Policies and Financial Stress in Agriculture

Hoy F. Carman and Sermin D. Hardesty

Special income tax rules that apply to agricultural investments have been extensively used and exploited both by farmers and by nonfarm investors for more than twenty-five years. Although farmers and organizations that represent their interests have supported "tax breaks" for agriculture, there is growing evidence that short-run gains from provisions for cash accounting, current deduction of capital expenses, capital gains income, accelerated depreciation, and investment tax credits may adversely affect longer-run agricultural returns. The differential impacts of those tax provisions on agricultural investments can be related to structural changes in agriculture. In addition, income tax rules have influenced investment behavior that was characteristic of many farm firms currently facing the greatest financial difficulties.

Links between federal income tax provisions and current farm financial problems are the focus of this paper. It is important to note, however, that many factors, including farm income, interest rates, inflation, expectations, and income taxes, have interacted to produce financial stress in agriculture. In this paper we will present a simple model relating taxes to capital investment, use the model to describe farm firm optimizing behavior as tax rules change, and then, relate optimizing behavior to current conditions and to tax rule changes that will occur as a result of the Tax Reform Act (TRA) of 1986.

Taxes and Capital Investment

Jorgenson (1963, 1967) developed a neoclassical measure of the cost of capital services that clearly specifies the interactions between income tax provisions. Given constant prices and 100 percent equity financing, Jorgenson's cost of capital services (c) is

$$c = q(r + d)(1 - uz - k) / (1 - u) \qquad (1)$$

where q is the acquisition price of capital, r is the real after-tax rate of return for assets, d is a constant rate of depreciation, u is the constant tax rate for the firm, z is the present value of depreciation deductions per dollar of investment, and k is the investment credit rate. The model is based on the assumption that r is the same for all assets and remains constant under any set of tax rules. Thus, the cost of capital services is the implicit rental price for a new unit of capital. The marginal conditions determine optimal output levels and input factor requirements.

Changes in tax rules affect the cost of capital services and, hence, the optimal capital stock. Examination of Equation 1 indicates that the cost of capital (c) decreases when the investment credit rate (k) increases. Acceleration of depreciation deductions raises the value of z and has a similar effect. The effect of a change in the tax rate (u) is indeterminate; it depends on the relative values of the tax parameters in the numerator of the equation. That can be illustrated. Differentiating Equation 1 with respect to the tax rate yields

$$\frac{\partial c}{\partial u} = q(r + d)(1 - z - k) / (1 - u)^2 \qquad (2)$$

The expected result is that the cost of capital services falls when the tax rate is decreased. A decrease in the tax rate could cause the cost of capital services to rise, however, if the depreciation schedule is very rapid and the investment credit is high such that the expression (1 - z - k) is negative. The tax savings from depreciation and other

Hoy F. Carman is a professor of agricultural economics, University of California, Davis. Sermin D. Hardesty was formerly an assistant professor of agricultural economics, Michigan State University and is now senior economist, California Rice Growers Association. Giannini Foundation of Agricultural Economics Research Paper No. 820.

deductions decrease when the tax rate is reduced. Jorgenson's model demonstrates that interactions between tax provisions can reduce optimal capital stock levels when the tax rate decreases.

Relationships Between Tax Policy and Financial Stress

Current financial stress in agriculture is characterized by the inability of many farm firms to service their debt from current income. Between 1970 and 1980, farm debt more than tripled (from $50.5 billion to $170.4 billion) as a result of investments in land, machinery, and equipment and of increased operating expenses. A combination of macroeconomic factors and income tax provisions contributed to the sharp increase in debt during the 1970s. The major macroeconomic factor was relatively high inflation associated with low real interest rates, favorable commodity prices, increasing prices for inputs, and rapidly increasing land prices. Important income tax provisions included progressive tax rates, accelerated depreciation, investment tax credits, deductibility of interest, current deduction of some capital expenses, cash accounting, and favorable capital gains tax rates.

The investment incentives offered by special farm income tax provisions were well publicized during the late 1960s and early 1970s. Nonfarm investors were urged to shelter ordinary income through investments in grove, vineyard, and orchard development, breeding livestock, and cattle feeding. Packaged as limited partnerships, those investments attracted substantial numbers of nonfarm investors and they have had long-lasting structural impacts on several agricultural sectors. The value of special farm income tax provisions to expansion-minded farmers was not overlooked by the astute manager, especially when commodity prices were favorable. Farmers, with the advice of their lawyers and accountants, developed irrigated and nonirrigated land, beef and dairy herds, confinement hog operations, and a variety of perennial crops. Investments designed to exploit farm income tax provisions, whether made by farm or by nonfarm investors, tended to be highly leveraged. For some "abusive shelters," investors had positive cash flow from the investment, that is, their income tax refund due to the investment was greater than the cash required for the investment.

Federal income tax provisions can be linked to farm financial problems through observation of the major impacts of tax-motivated investments. Two types of impacts are of interest: aggregate impacts on production of specific crops, and impacts on financial decisions.

Crop Production

Special farm income tax provisions encouraged investment in selected agricultural enterprises, increased production from those enterprises, and are related to financial stress through the price effects of increased production. Farm level price elasticity of demand is inelastic for almost all agricultural products. Thus, any increase in production is associated with not only lower per unit prices but also decreased total revenue.

Agricultural enterprises for which tax incentives were effective and where there is some evidence of increased output as a result of incentives include livestock (beef cattle, dairy cattle, hogs), poultry (eggs), and perennial crops (especially grapes, walnuts, citrus, almonds, avocados, pistachios, and kiwi).[1] Income tax incentives were also a factor in land and irrigation development with the developed land being used for production of feed grains and oilseed crops. The investment tax credit and accelerated depreciation deductions promoted purchases of farm machinery and construction of farm facilities. To the extent that the new machinery and facilities increased productivity, those tax provisions also contributed to increased production. Although we are unable to accurately document the impact of tax provisions on agricultural production and commodity prices, it is obvious from some of the research cited above that tax provisions have had far-reaching and sometimes very

[1]For descriptions of utilization of income tax investment incentives and some of the impacts, see Carman (1968, 1972, 1981); Bryant, LaDue and Smith; Meisner and Rhodes; Youde and Carman; Davenport, Boehlje and Martin; Harrison and Woods; and Duffy and Bitney.

significant impacts.[2] Thus, the downward pressure on prices as a result of tax-motivated agricultural investments is a factor in farm financial stress.

Financial Decisions

Special farm tax rules, when used to shelter ordinary income from taxes, have obvious effects on investment behavior and patterns of investment. Cash accounting provides an opportunity to defer income through the prepurchase of inputs (feed and fertilizer) and prepayment of interest and fees.[3] The cattle feeding tax shelter, for example, was based on large, leveraged year-end feed purchases (to be fed the following year) to accomplish the income deferral objectives of nonfarm investors. At the height of its popularity, most year-end placements of feeder cattle in feed lots were used for tax shelters.[4] Year-end purchases of machinery, equipment, and other assets were obviously encouraged by tax provisions for accelerated depreciation and investment tax credits. Those provisions combined with the ability to take a current deduction for expenses of a capital nature were the basis for tax shelter investments in breeding livestock, dairies, hog production, and perennial crop development. Although the effects of cash accounting, accelerated depreciation, investment tax credits, capital gains, and the current deduction of capital expense tax provisions on investment decisions have been documented for both farm and nonfarm investors, the impact of other very important rules such as deductibility of interest and progressive tax rates have received little attention.

Income tax incentives have differential impacts by income class because of progressive tax rates. A taxpayer in the 50 percent marginal tax bracket realizes a tax saving of 50 cents for each dollar deduction while a taxpayer in the 30 percent bracket realizes tax savings of only 30 cents for the same dollar deduction. Thus, the after-tax value of a dollar of deductions from interest, depreciation, or other deductible expenses is a positive function of the income level of the taxpayer. It is not surprising that tax incentives in agriculture have been used most by high-income individuals, whether their income was from farm or nonfarm sources.

Farm income tax provisions have encouraged expansion by high-income farm firms. Hanson and Eidman's study of tax expenditures confirms that conclusion; they found that, during the 1970s, farm firms with high annual sales were likely to make greater use of the investment credit, interest, and depreciation deductions, and capital gains provisions on the sale of livestock than firms with low sales. An analysis of California crop farm investment response to changing tax laws yielded similar conclusions (Hardesty, Carman, and Moore). That study found that the high-income farm could afford to pay more for an asset (such as land or machinery) than could a low-income farm because the high-income farm received greater tax savings on its interest deductions than did the low-income farm. In addition, interactions between the progressive rate structure and the deductibility of interest expenses and depreciation cause the investment opportunities of high-income farms to expand relative to low-income farms. Because of the importance of interest deductions on after-tax returns from agricultural investments, expansion-minded farms were encouraged to make liberal use of debt, and many were highly leveraged.

Indebtedness associated with land purchases is an important component of current financial stress. As noted, interest deductions are worth more to high-income farms than to low-income farms. High-income taxpayers have also enjoyed a significant advantage upon sale of land as a result of capital gains provisions. Due to the combined effects of the capital gains provision and interest deductibility, the maximum price that a purchaser was willing to pay for farm land increased with the purchaser's marginal tax rate (Boehlje 1981).

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[2]The Tax Reform Act of 1969, for example, shifted investor interest from citrus and almond grove development to development of grapes and other perennial crops. The impact of tax-motivated grape plantings during the 1970s continues to depress returns from California vineyards.

[3]At one time investors were prepaying several years interest on land purchases. That practice was terminated by an IRS ruling in the late 1960s. Since then the use of prepayments has been restricted, especially for limited partnership syndications (by the Tax Reform Act of 1976 and rulings, see Elder and Kupper 1978).

[4]For descriptions of the year-end activities of cattle feeding syndicates, see Youde and Carman (1972), Meisner and Rhodes (1974), and Dietrich, Levi, and Martin (1977).

When commodity prices rose sharply in the early 1970s, farm land prices increased, reflecting optimistic expectations regarding future commodity prices. Nonfarm investors began to view farm land in a favorable light; increases in land prices provided returns that outpaced not only the general price level but also returns from most other investments. In addition, estate tax rules acted to restrict the supply of farm land offered for sale (Boehlje 1986). The gains on farm land that passes upon death are exempt from income taxation; that exemption encourages the holding of farm land until death. There are also estate tax preferences that discourage farm land sales both before and after death. Thus, both farm and nonfarm investors were actively seeking a limited supply of farm land, and prices were bid up rapidly. Increased equity from owned farm land was viewed favorably by lenders, and equity refinancing was common. A combination of expectations and favorable income tax rules were, thus, an important component in the land price spiral.

An analysis of the effect of the Economic Recovery Tax Act of 1981 (ERTA) on agricultural investment behavior of California row crop farmers demonstrates that income tax rules can significantly affect farm investment patterns, financing decisions, and growth (Hardesty, Carman, and Moore). ERTA, which had the objective of increasing capital formation, decreased the depreciation period for capital assets, liberalized the investment tax credit, reduced individual income tax rates, and indexed tax rates for inflation. A dynamic optimization model was used to examine investment behavior for three hypothetical farms under three income tax scenarios; pre-ERTA, post-ERTA, and no income taxes. The model optimizes all decisions with the objective of maximizing the farm firm's net worth.

Each of the three hypothetical farms made annual decisions over an eight-year period on investment in land and machinery, savings, debt, land leasing, total acreage planted, and crop mix. Each farm firm had the same beginning position (land, machinery, savings, debt, and net worth) for each tax scenario; only the income tax rules differed. All land farmed at the beginning of each analysis was owned. The small farm contained 320 acres, the medium farm contained 640 acres, and there were 1,280 acres in the large farm. The most important effects of the tax law changes were on land and machinery purchases, debt, and savings.

None of the three hypothetical farms purchased land in the no-tax situation; all growth was through leasing, although fewer acres were leased than the constraints allowed. Each farm grew the maximum allowed in the two tax situations, but methods differed by situation and farm size. A greater proportion of the expansion was by land purchase in the pre-ERTA than in the post-ERTA scenario. Lower tax rates, effective with ERTA, decreased incentives to purchase farm land with debt financing.

Present values of machinery purchases in each farm size were highest for the pre-ERTA scenario, and lowest for the no-tax scenario. The decrease in machinery purchases as tax rules moved from the pre- to the post-ERTA scenario was unexpected. Changes in investment tax credit and depreciation rules in ERTA were designed to encourage increased machinery investment, but that positive effect was offset by reduced tax rates. Lower tax rates decrease the present value of tax savings from interest and depreciation deductions and increase the desirability of repairing machinery rather than replacing it.

Even though ERTA reduced machinery purchases, the farms still held excess machinery capacity. For example, the number of crawler tractors owned by the large farm in the terminal period for each tax situation was: pre-ERTA, 6.73; post-ERTA, 4.99; and, no-tax, 2.31. Because crops grown were identical under pre- and post-ERTA tax rules and differed only slightly in the no-tax situation, differences in machinery purchases could be attributed almost entirely to tax rules.

Each model farm financed land and machinery purchases and made decisions regarding savings and equity refinancing. There were signficant differences in optimal levels of saving and debt by tax scenario. None of the farms had any savings in the pre-ERTA tax situation, and debt levels were high. Medium and large farms had some savings in the post-ERTA situation but also had relatively large debts. Without taxes, the model farms added significant amounts to

savings and reduced their debt to very low levels.

Equity refinancing practices differed by farm size and tax situation. There was no refinancing in the no-tax situation. Refinancing was substantially greater in the pre-ERTA than in the post-ERTA situation for all farm sizes. The higher pre-ERTA rate of refinancing results from lower net cash flows (especially for the small farm) and higher tax savings for pre-ERTA interest deductions. Total terminal period debt for the large farm by tax scenario was: no-tax, $188,108; pre-ERTA, $4,884,230; and post-ERTA, $3,894,801.

Those results suggest that income tax rules that promoted debt financing are partially to blame for the financial crisis now faced by many farms. The pre-ERTA tax rules were in effect through 1981. As shown by the pre-ERTA results, when crop prices and taxable incomes were high in the mid-1970s, the deductibility of depreciation and interest payments, combined with investment tax credits and progressive tax rates, promoted land and machinery purchases and encouraged debt financing. Now with lower crop prices, high real interest rates, and depressed land values, many farms do not have the cash flow necessary to service their debt and are unable to improve their position by selling land.

Many financially troubled farmers have been criticized for being land speculators, for lacking prudence in their financial dealings, and for being poor managers. Although those descriptions fit some farmers, most were simply following financial practices consistent with the maximization of net worth over time under existing tax laws. Neither they nor their bankers could foresee weakened commodity prices and the downward spiral in land prices. Analytical results indicate that fewer farmers would have been vulnerable to the downturn if a different set of income tax laws had been in effect during the 1970s.

Tax Policy Options to Alleviate Farm Financial Stress

Several tax policy responses to help alleviate the financial stress facing the agricultural sector have been suggested. Lins, for example, identifies tax solutions designed to enhance income, to encourage farm asset liquidation, and to promote investment in the farm sector by nonfarm investors. A summary of Lins's evaluation of those alternatives follows.

A negative income tax for farm taxpayers with negative incomes has been suggested as a policy response to enhance income. However, previous negative income tax proposals have lacked strong political support because they were costly, were difficult to administer, and discouraged recipients from considering other income-generating activities. A more moderate approach to enhancing the income of financially stressed farm firms is to extend the carry-back period on net operating losses and investment tax credits beyond the three years allowed under current laws. Financially stressed farm firms would be refunded a portion of the tax payments that they had made during more profitable years.

Many financially stressed farm firms are being advised to liquidate part or all of their assets. They may, however, face substantial tax liabilities on the sale of land, livestock, and machinery. A farm that purchased farm land at low prices many years ago and that refinanced the equity to meet cash flow shortfalls during the early 1980s could face a large tax bill on the gain in land value, even at today's depressed prices. Machinery sales can also trigger tax liabilities arising from the recapture of investment tax credits and depreciation deductions. Farm firms that negotiate debt workouts with their lenders may incur tax liabilities on a portion of any discharged indebtedness. Tax provisions could be revised to exempt from taxation income associated with farm asset liquidations.

Farm liquidations have been difficult due to the weak market for farm assets. There have been sharp decreases in asset values during the last three to four years and farm lenders have accumulated large amounts of property acquired through foreclosure. One possible income tax option for bolstering demand for farm assets would be to allow the transfer of net operating losses to purchasers along with the assets. That would provide incentives for purchase of such assets by

nonfarm investors who are seeking tax write-offs; it would also protect the equity of remaining farmers. A similar alternative would be to allow a seller to transfer to the buyer any capital losses incurred from the sale of farm land that had been purchased at high prices. It is likely that a financially stressed farm firm would not have other income to offset the loss associated with the sale of land. However, the loss could provide an attractive tax shelter for a high tax bracket investor. Revising tax laws to allow the transfer of such losses would strengthen the demand for farm assets and help to stabilize their values. There are questions concerning the desirability of the resulting ownership structure for farm land and the distribution of benefits from such a tax expenditure program.

Prospects for Change

The various tax law changes discussed above could benefit the farm sector financially in the short run. In the long run, however, they could be harmful to farmers if they create distortions that impede the adjustments needed to restore profitability in the farm sector. Barry and Boehlje caution against the use of tax policy to obtain socially desirable goals " . . . because the end result in terms of farm structure and financial health of the industry may be exactly the opposite of what was intended" (p. 224). We have a strong bias against the use of income tax expenditure programs and support the Barry and Boehlje position. Income tax expenditures are open-ended, the benefits are based on income with the highest bracket taxpayer gaining the most benefit, and the expenditures tend to be concealed. Tax expenditures have often provided benefits to individuals and groups who would have been unable to secure an equivalent amount of direct government support in the form of a grant or a payment. The financial stress in the farm sector is partly attributable to preferential tax treatment; further preferential treatment could produce additional problems.

The Tax Reform Act of 1986

The TRA of 1986 has general provisions applicable to all taxpayers as well as provisions specific to agriculture that are related to financial stress in agriculture. Those provisions have both short- and long-run implications for agriculture.

Short-Term Relief for Financial Stress

The TRA of 1986 has provisions that may provide some direct relief to farm firms under severe financial stress. Limits will restrict the use of those provisions to taxpayers in need of assistance; the provisions cannot be regarded as preferential treatment that is susceptible to exploitation. Most helpful will be a provision to facilitate restructuring debt. Previously, taxpayers who discharged debts by reconveying property were liable for taxes on the difference between the amount of debt written off and its basis in the property, unless the indebtedness could be excluded under section 108 of the Internal Revenue Code. Under the new law, qualified farm debt is expanded to include farm land. In exchange for that exclusion, the farmer's basis in any remaining assets, including farm land, will be reduced. That addition of a new exclusion for farm land under section 108 should reduce the incentive to seek protection under the bankruptcy code.

The TRA of 1986 repeals the investment tax credit, effective January 1, 1986. In addition, only 65 percent (82.5 percent in 1987) of unused investment tax credits can be carried forward. Farmers earning 50 percent or more of their gross income from farming would be allowed a fifteen-year carry-back of existing investment tax credits. The amount available would be limited to the lowest of three options: 50 percent of carry-overs, the taxpayer's net tax liability for the past fifteen years, or $750. Note that farmers as a group have substantial unused investment tax credits; the amount held by farm sole proprietors was estimated to be more than $3 billion in 1983, and the accumulation is probably even greater now. Thus, the 35 percent reduction in value for investment tax credit carry-overs could cost farmers in excess of $1 billion in unused tax credits.

Long-Term Impacts Related to Financial Stress

The TRA of 1986 is a major change in federal income tax policy. Because of the large number of changes in provisions that impact agriculture as well as other sectors of the economy, it will be extremely difficult to sort out the probable long-term impacts. Interactions between tax provisions and between different economic sectors can produce major and unexpected results. We

can examine the major provisions in light of previous research to form hypotheses regarding impacts; although one can speculate on the direction and nature of change, estimates of the magnitude of change are without foundation.

Important tax provision changes in the TRA of 1986 with possible impacts on agricultural investments include changes in tax rates, capital gains, investment tax credits, depreciation, restrictions on use of cash accounting, capitalization of preproductive expenditures, and restrictions on losses from passive activities. Those changes should effectively curtail tax-motivated agricultural investments by nonfarm investors and modify the savings, the financing, and the investment behavior of farmers. A brief discussion of some possible impacts of the changes on agriculture follows.

The TRA of 1986 includes significant reductions in marginal tax rates. The current fourteen tax brackets with rates ranging from 11 to 50 percent will be reduced to two brackets with rates of 15 and 28 percent beginning in 1988. A 5 percent surtax will be effective on joint taxable incomes in the range of approximately $72,000 to $200,000, making a third bracket of 33 percent. That will tend to increase the after-tax cost of deductions for interest and depreciation and will reduce the advantage formerly enjoyed by high-income over low-income farmers and investors. In light of our previous work, the reduced rate change by itself should tend to increase savings, reduce farm debt, and reduce investments in land and machinery (Hardesty and Carman). That should help reduce the future occurrence of financial stress.

There are several provisions that will tend to reduce investment in farm assets by both farmers and nonfarm investors. Repeal of the 10 percent investment tax credit and slightly slower depreciation (write-off periods for most farm assets are increased from the current five years to seven years) will discourage investment in depreciable farm assets. Elimination of the capital gains deduction for gains on assets such as land, livestock, and buildings will increase taxes on the sale of those assets and, thus, will act to discourage investment.

Other new tax provisions are clearly designed to restrict nonfarm investors' tax shelter opportunities in farming, and tax-motivated investment by nonfarmers should be curtailed. Under current law, losses generated from one activity could usually be used to offset income from other sources. New passive loss rules allow only taxpayers who are involved in farming on a regular, continuous, and substantial basis to use farm losses to offset other wage and salary income. Passive investors cannot use farm losses to offset other income, but such losses can be carried forward and used to offset future passive income from the same activity. The farm losses that investors previously deducted from other income were often due to expenditures associated with the development of certain capital assets, including the costs of raising dairy, draft, breeding, and sporting livestock to maturity and the costs of caring for new orchards and vineyards until they reached bearing age.

New legislation requires the capitalization of preproductive expenditures for assets with a development period of more than two years. That rule combined with elimination of the capital gains deduction ends tax shelter opportunities for livestock and orchard development. Note that farmers can elect to continue expensing preproductive expenditures, but if they do, gains from the sale of developed assets would be taxed as ordinary income to the extent of prior deductions, and they would be required to use straight-line depreciation on all depreciable farm property. In addition the current deduction for land clearing expenses is repealed. Farmers' flexibility in the use of cash accounting for input purchases is also restricted. Under TRA farmers using cash accounting can not deduct the costs of prepaid feed, seed, fertilizer, and similar supplies prior to the year consumed if they exceed more than 50 percent of the expenses for which economic performance has occurred.

Each of the tax rule changes discussed above is expected to lead to reduced investment in agricultural assets, to decrease the productive capacity of U.S. agriculture, and to decrease incentives for debt financing. Reduced investment should lead to reduced production and higher farm product prices over time because of the inelastic nature of demand for farm products. Note that the

adjustment will not be immediate but will occur over several years. After the adjustment period, higher farm prices should more than offset the higher taxable farm incomes associated with the loss of investment incentives. The short-run impact is expected to be negative for many farmers and most nonfarm investors because the loss of tax incentives is immediate, but the price and revenue benefits of reduced production will take several years to become evident.

We know from other research that the impact of the total package of tax law changes in the TRA of 1986 may differ from the individual effects noted above. In addition, the nature of changes in tax rules for agriculture must be considered relative to changes in other sectors of the economy. When analyzing the impact of Treasury's tax simplification proposals, for example, we found that each provision taken alone resulted in decreased land purchases, but when all provisions were considered as a package, optimal land purchases increased (Hardesty and Carman p. 16). Consolidation and reduction of tax rates increased the funds available for investment while elimination of the investment tax credit and extended depreciation periods improved the attractiveness of land investments relatives to machinery and other depreciable assets. Even though designed to be revenue neutral, the TRA of 1986 will have differential impacts on various sectors of the economy. The attractiveness of land investments relative to machinery and other depreciable assets sheltered investments. The proportion of taxes paid by businesses is expected to increase as the proportion paid by individuals decreases. Average income tax rates are expected to increase for capital intensive industries and decrease for service-oriented firms. With those differential changes, it is easy to imagine a scenario in which the attractiveness of farm land as an investment becomes stronger instead of weaker.

Concluding Comments

Financial difficulties currently being experienced by the U.S. farm sector are partially attributable to federal income tax policies. Income tax laws have affected production, investment, and financing decisions in agriculture. Those laws have encouraged increased investment in the agricultural sector, increased production of most agricultural products but especially livestock and perennial crops, and they have encouraged increased indebtedness. Increased production has placed downward pressure on commodity prices and income, and investment incentives were an important factor in the increase in land prices during the 1970s. Debt problems are at the heart of the current farm finance crisis, and much of the debt can be attributed to incentives provided by income tax rules effective during the 1970s.

The TRA of 1986 will reduce the incentives that promoted overinvestment in the agricultural sector and encouraged excessive indebtedness by many farm firms. Tax incentives for nonfarm investment in agriculture have been terminated. Elimination of the investment tax credit, longer depreciation periods, and reduced tax rates will decrease tax-motivated investment by farmers when farm incomes improve. The deductibility of interest expenses will, however, continue to provide incentives for debt, but the incentive is decreased as a result of lower tax rates. High-income taxpayers will continue to enjoy some after-tax advantage in bidding for land and other assets because of rate differentials, but that advantage has been sharply reduced. There will be a period of adjustment to the new tax laws, during which time some farms may find their taxes increased. Over time, the movement of tax laws in the direction of economic neutrality in decision making should be in the long-run economic interests of agriculture as well as other sectors of the economy.

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Resolving Financial Stress in Agriculture by Altering Loan Terms: Impacts on Farmers and Lenders

Glenn Pederson, Michael Boehlje, Damona Doye, and Robert Jolly

The financial stress faced by farmers and the agricultural production sector has been the focus of much discussion, debate, and analysis in recent years. Projections of farm financial conditions and failure rates, along with various policy responses to ameliorate financial stress have received the most attention. Discussion of the implications of agricultural financial stress on lenders has been descriptive in nature. The focus has been on deterioration in financial performance of various types of lenders, projections of future losses, description of the implications of failed financial institutions for individual borrowers and various communities, and speculation concerning the long-term restructuring of agricultural financial institutions that may result from the current economic and financial crisis in agriculture.

Although individual lenders are projecting the implications of changing portfolio performance on their financial viability and stability, little firm level analysis of the implications of portfolio composition and financial characteristics of individual lenders on lender survivability and performance has appeared in the published literature. That relative void in the literature is the primary stimulus for this discussion. We will focus our attention on the impacts of financial stress in agriculture on lenders with various financial and portfolio characteristics.

The discussion proceeds by first summarizing farm level and sector level estimates of the magnitude of the farm debt problem. Issues of private versus public sector resolution of the problem, including private sector absorptive capacity, and objectives and implementation problems associated with public sector intervention are discussed. Resolution strategies involving alteration of loan terms are briefly described. A conceptual framework and a simple model of lender behavior are described, and results generated from the application of the framework and model to individual lenders with various financial characteristics are presented. The final section develops implications for the agricultural lending industry and presents conclusions of the analysis.

Glenn Pederson is an assistant professor, and Michael Boehlje is a professor and head of the Department of Agricultural and Applied Economics at the University of Minnesota. Damona Doye is an assistant professor in the Department of Agricultural Economics at Oklahoma State University. Robert Jolly is assistant dean and director of the Iowa Agricultural Experiment Station, Iowa State University.

Magnitude of the Farm Debt Problem

The balance sheet of agriculture for December 31, 1985, lists total sector debt at $204.8 billion. Results of the *1986 Farm Costs and Returns Survey* indicate that $113.3 billion of the total sector debt is attributed to debt owed by farm operators for their agricultural operations (Johnson et al. 1986). The difference between the total sector debt and farm business debt ($91.5 billion) is comprised of loans on the farmer's dwelling if it is located on the farm ($8.3 billion or 9.1 percent of the difference), the farm debt of landlords ($11.9 billion or 13 percent), debt of farmers used for nonfarm purposes ($10 billion or 10.9 percent), estimated underreporting of Commodity Credit Corporation (CCC) debt ($8.6 billion or 9.4 percent), small farms' debt ($13.6 billion or 14.9 percent), and unexplained differences ($39.1 billion or 42.7 percent). Although outstanding sector debt and farm operator debt has declined in recent years, asset value

declines have eroded the agricultural sector's equity.

Sector statistics, however, do not adequately reflect the heterogeneity in existing conditions at the farm level. More operators have high debt-to-asset ratios (.4 to .7) and very high debt-to-asset ratios (greater than .7) in 1986 than in 1984 or 1985, as reflected in Table 1. The percentage of farm operator debt held by individuals with debt-to-asset ratios greater than .7 is increasing. In 1986, an estimated one-third of farm operator debt was held by less than 10 percent of all farm operators with .7 or greater debt-to-asset ratios.

A high leverage ratio is not, in and of itself, a problem. Individual farm operators may have less equity and higher debt-to-asset ratios even if the farm's profitability is unchanged or improved. But a high debt-to-asset ratio makes a farm more vulnerable to both operating losses and declining asset values. A high leverage ratio becomes a problem when operating losses reduce equity so significantly that the operating ability of the farm is impaired.

The distribution of farm operators and farm debt by debt-to-asset ratio class and net cash income is shown in Table 2. Positive and negative farm household net cash income (NCI) estimates equal net cash operating income less principal repayments and estimated family living expenses plus nonfarm income. Nearly 45 percent of all farm operators reported a negative NCI for 1986. It is important to note that highly leveraged farmers were more likely to have negative NCI. It should be emphasized that although the NCI figures include nonfarm income and estimated family living expenses, those statistics do not include costs associated with the farmer's personal or other nonfarm debt obligations. Therefore, the family's debt-to-asset ratio may be underestimated, and the solvency potential may be overestimated.

Table 1. Distribution of U.S. Farm Operators and Farm Debt by Debt-to-Asset Ratio, 1984–86

Year	Debt-to-Asset Ratio 0–.4	.4–.7	.7+
	Percent of Farm Operators		
1984	82.3	11.1	6.6
1985	81.1	11.6	7.3
1986	78.7	12.7	8.6
	Percent of Farm Debt		
1984	43.8	32.5	23.7
1985	38.1	32.9	29.0
1986	33.7	32.9	33.4

Source: Johnson et al. (1985) and Johnson et al. (1986).

The rate of return to equity measure of financial condition combines income and balance sheet information and indicates the rate at which the equity capital stock of a farm is being increased or decreased. Cross-classifications of farms by rate of return to equity and debt-to-asset ratio provide additional insights into financial conditions in the agricultural sector. Table 3 contains the distribution of farms by debt-to-asset ratio and farm household rate of return to equity for 1986. Household rate of return to equity is defined as net cash operating income less a family consumption allowance plus off-farm income, all divided by equity.

A positive rate of return to equity means that funds are available to retire debt, replace

Table 2. Distribution of U.S. Farm Operators and Farm Debt by Debt-to-Asset Ratio and Net Cash Income (NCI), 1986

	Debt-to-Asset Ratio 0	0–.1	.1–.4	.4–.7	.7–1	1+	All
			Percent of Farm Operators				
Negative NCI	17.75	6.03	9.69	6.17	2.40	2.61	44.65
Positive NCI	21.79	9.17	14.27	6.54	2.25	1.34	55.35
Total	39.54	15.20	23.96	12.71	4.65	3.95	100.00
			Percent of Farm Debt				
Negative NCI	0	1.42	11.82	16.28	9.72	11.17	50.40
Positive NCI	0	2.47	17.97	16.61	7.65	4.89	49.59
Total	0	3.89	29.79	32.89	17.37	16.06	100.00

Source: Johnson et al. (1986).

Table 3. Distribution of U.S. Farms by Debt-to-Asset Ratio and Farm Household Return to Equity, January 1, 1986

Farm Household Rate of Return to Equity	Debt-to-Asset Ratio						
	No Debt	.01 to .1	.11 to .4	.41 to .7	.71 to 1	Over 1	All Farms
Greater Than .2	6.98	2.09	5.36	4.63	2.31	—	21.37
.1 to .19	4.49	2.51	3.60	1.47	.32	—	12.39
.05 to .09	4.42	2.12	3.32	.83	.13	—	10.82
-.05 to .04	12.57	5.56	6.37	1.87	.15	—	26.52
-.1 to -.06	3.86	1.34	1.95	.81	.10	—	8.06
-.2 to -.11	3.95	.94	1.72	.85	.19	—	7.65
Less Than -.21	3.27	.65	1.64	2.24	1.36	—	9.16
Insolvent Farms	—	—	—	—	.07	3.95	4.02
All Farms	39.54	15.21	23.96	12.70	4.63	3.95	100.00

Source: Johnson et al. (1986).

equipment, expand the operation, or to support increased family living expenditures. Operations with household rates of return greater than 5 percent are probably financially stable and able to keep current on payment obligations. Farms with rates of return of .05 to -.05 may be stable in the short run, but will need to make changes to improve profitability in the long run. Households with a rate of return below -.05 are eroding equity at a moderate-to-fast rate. For instance, a farm with a -.2 rate of return has reduced its current equity by 20 percent and would become insolvent within a few years, if the operation continued to generate negative returns.

If it is correct that farms that are technically insolvent (or have both high debt-to-asset ratios and significant negative returns to equity) are unlikely to survive, then nearly 12 percent of the farms will fail. Forty percent of those farms (4 percent of U.S. farms) are technically insolvent. The value of their debts equals or exceeds the value of their assets. The remainder (nearly 6 percent of U.S. farms) have negative returns to equity exceeding -.05, and a debt-to-asset ratio greater than .4.

Similar projections for the commercial farm sector from a simulation model are reported in Doye and Jolly. They estimate that with expected rates of return and some ability to improve financial conditions on stressed farms (for example, increase off-farm income, reduce costs or increase returns, expand the operation by renting productive assets) nearly 9 percent of the operators would have to liquidate completely to generate a positive cash flow. More than one-third of the commercial farm operators would need to sell some assets to achieve financial stability. In making the transition to a more stable debt and asset distribution, nearly 17 percent of the assets of commercial operators would change hands. About one-half of the debt held by commercial farm operators would be liquidated with another 3 to 4 percent of the debt written off.

Regional estimates of asset liquidation and debt write-offs provide more insight into expected restructuring of commercial U.S. farms in response to financial stress (Doye and Jolly). The range in estimates is reflected in the differences between the eastern and central regions of the U.S. In the eastern region, only 2 percent of the operators are expected to sell out as a result of financial problems. About one-fourth of the total farm operator debt in that region is expected to be retired with 1 percent of the debt discharged. Nearly 5 percent of the assets of commercial farms might be sold in the eastern region. At the other extreme, 38 percent of the operators in the central region have negative projected cash flows and 12 percent of those operators would need to liquidate all assets to solve financial problems. In the central region, nearly 60 percent of the debt would be liquidated and more than 5 percent would have to be discharged. Almost a quarter of the assets owned by commercial farm operators in the central region would be sold in the transition process.

Private Versus Public Sector Resolution

Given that the short-run financial problem in agriculture is too much debt, the challenge becomes one of reducing the debt load of the sector and of individual farms. Fundamentally, debt can be eliminated in only three ways: it can be paid down with earnings, off-farm income or other sources of cash including gifts, inheritances, and so forth; it can be paid down with the proceeds from the sale of assets used to secure the indebtedness, or the sale of other farm or nonfarm assets held by indebted farmers; or it can be written off by the creditor as a loss. Given the limited earnings capacity of highly leveraged farmers, it is anticipated that a large proportion of the debt resolution problem will occur through the latter two strategies—asset liquidations and lender write-offs.

A fundamental issue that is yet to be resolved is the role of the public sector in solving the financial stress problem in agriculture. Without public sector intervention, the cost must be borne and shared by various segments of the private sector—the farmer-borrower, lenders (both institutional and individuals), input supply and agribusiness firms, and so forth. Public sector intervention might be justified for five reasons: the private sector does not have the capacity to absorb losses without incurring major impairment to the human capital and the productive base of the sector; equity and social conscience suggest that the agricultural sector alone should not bear the full cost of financial stress; public policy contributed to the problem, and consequently, the public should share part of the cost of resolution; public sector intervention may ease the transition and reduce the chances of excessive adjustments or "overshooting" by the private sector; and without public sector intervention and monitoring, the cost would be shared inequitably within the private sector.

One should note that the mere substitution of public sector debt for private sector debt, if that debt is to be serviced by the same creditor, does little to resolve financial stress. For some individual borrowers, substituting public sector debt with somewhat lower interest rates and longer repayment terms for private sector debt will improve the chances of servicing the debt obligation, but for a large proportion of financially stressed farmers, the rate reduction and longer repayment schedules that can be realistically expected from public sector compared to private sector terms are not sufficient to significantly improve the chances of repayment. For many farmers, resolution has to occur through reducing the debt obligation, not just through substituting one type of debt for another.

Consistent with the aforestated objectives of public sector intervention, the public sector could play a critical role in facilitating and monitoring the private sector resolution (or "deal cutting") that will occur in the absence of more direct intervention. That facilitation and monitoring role could occur in three ways: by reducing the transaction costs (including the tax burden as reflected in the 1986 Tax Reform Act) of debt resolution and write-offs; changing the rules with respect to who is required to take the loss as reflected in alterations of federal bankruptcy law (the new Chapter 12) and changes in many state bankruptcy provisions with respect to exempt property; and structuring and "forcing" the negotiation process between borrower and lender through such mechanisms as mandatory mediation. Note that the goals and objectives of such public sector intervention are significantly more modest than the programs involving direct subsidies or substitution of public for private sector debt—the transaction costs of resolution are shared or the loss is reallocated among various private sector parties, instead of shared directly with the public sector.

Irrespective of the method of public sector intervention, a number of implementation issues arise. Who should be the target of public sector intervention—farmers in severe financial stress not likely to survive; farmers who can continue to operate for a period of time but whose condition is deteriorating; financially stressed agribusiness firms as well as producers; agricultural lenders, nonagricultural businesses in rural communities, and so forth? If a particular group is targeted for public sector assistance, how should the intervention program be structured to reduce leakage to nontargeted groups? What are the equity-distribution implications of targeting? Will public sector

intervention alter long-run lender and/or borrower behavior and reduce the "discipline of the market" by fostering expectations that the public sector will rescue the private sector from "bad" decisions? How do we effectively and efficiently implement whatever public sector intervention is chosen? Implementation issues may be more important than policy design in developing a successful public sector intervention program.

The magnitude of projected liquidations of farms and assets presented earlier suggests that financial policy to facilitate the transition to more stable debt and asset distributions might be considered. The social costs of the change in the structure of agriculture may be unduly large if farmers are unable to make long-term adjustments quickly. Adjustments may be hindered if asset markets are saturated or farmers or lenders are unable or unwilling to negotiate. Financial policy can be used to redistribute the costs of financial stress among farmers, agricultural lenders, and governments at various levels.

For example, a generous interest buydown program for three years could reduce by one-half the number of commercial operators expected to liquidate completely (that translates into 4 to 5 percent of all commercial farm operators) (Doye). Average payments per farm are projected to be $24,000–$40,000 during the three-year period. Such a program is projected to cost more than $6 billion over three years. Even with that subsidy, principal and interest payment shortfalls are projected to be $1 billion to $2.5 billion nationally. Obviously, government and/or lender subsidies do not correct the financial problems of stressed farms. In fact, some or all of the farms receiving subsidies may fail financially after the buydown program is terminated. The payments may serve only to buy time for the farm operator to make financial adjustments or to liquidate completely.

Altering Loan Terms

The practice of forbearance by commercial farm lenders has received recent attention as a means for accommodating the gradual resolution of the farm debt problem (Brake et al.; Duncan). The concept of private sector absorption of debt hinges on the capacity and willingness of lenders to pursue those policies. Various strategies such as interest rate adjustment, modification of the debt repayment schedule, and debt discharge are consistent with the concept of forbearance. Where applicable, those strategies will be discussed in the context of existing programs or policy proposals.

In principle, forbearance occurs when the lender continues to carry loans that are delinquent and not fully performing. The lender is expected to pursue activities that improve loan quality and reduce the likelihood of loan foreclosure or liquidation. To be successful, those strategies must reduce debt service requirements to levels that are consistent with current and projected borrower earnings. It is important to recognize that voluntary forbearance often results in higher loan servicing costs and lower income for the lender. For that reason, it is useful to consider the available options and the limits that apply to each.

Interest Rate Reduction

Interest rate reduction is potentially an effective response to financial stress—one that has a short-run impact on the debt service problem yet does not alter the magnitude and the distribution of the underlying debt obligation. When the interest rate is temporarily reduced on an existing loan, the borrower benefits from a reduction in the interest component of operating expense. The benefit is directly proportional to the size of the rate reduction and increases with the size of the underlying debt obligation.

A rate reduction could be the result of a state- or federally-funded buydown, or the downward movement of market interest rates. Interest buydown programs, such as those implemented by a number of states during 1985 and 1986, achieved a temporary reduction in interest costs for qualifying farmers. State programs, which have been successful in channeling subsidized funds to farmers in that manner, provided incentives for lenders to match the subsidy on operating debt and on limited amounts of term (nonreal estate) debt. The maximum subsidy provided under the 1986 Minnesota program, for instance, was approximately $4,500 per farm. That represented between one-fifth and one-sixth of the annual interest paid, and about 80 percent of the cash

shortfall on average-profit cash grain farms in the state. On low-profit cash grain farms the interest subsidy reduced total interest by about one-tenth, and the cash shortfall by about 50 percent (Pederson and Eidman).

Falling market interest rates (to the extent they are currently being reflected in farm-level interest rates) will continue to reduce cash flow stress. Interest buydown programs have provided farmer recipients with a bridge between the recent high-rate period, and the emerging lower-rate period. They have also been a means of sharing the cost of financial stress in agriculture more broadly by the public at large rather than by the agricultural sector alone. A lower interest rate environment will likely reduce the incentive for interest rate buydown programs and shift the focus toward reduction of the debt burden.

Modification of the Debt Repayment Schedule

Adjustment of the principal retirement schedule provides a set of additional options. Principal repayments can be rescheduled or deferred. Rescheduling, or rewriting short-term debt to a longer repayment schedule, has been used by some short-term lenders in situations where the borrower has additional borrowing capacity and represents a reasonable credit risk. However, the shift toward repayment capacity as a lending criterion and a protracted recession in the farm sector have reduced the opportunities to reschedule short-term principal to a longer maturity when dealing with weak credit accounts.

The underlying premise of rescheduling is that the additional time provided to repay the debt will better match principal payment amounts with the periodic net cash income of the borrower (after taxes and family living withdrawals). Since debt retirement is conditional on business profitability, however, short-term cash flow tests will provide necessary, but not sufficient evidence that debt rescheduling will be a successful strategy in the long run.

A loan extension is a variation of debt rescheduling where the borrower is provided additional time to make a scheduled principal payment. Under a loan extension agreement, the outstanding principal is not rewritten to a longer maturity.

Deferral of principal is a modification of the debt repayment schedule where part or all of the scheduled principal payment is postponed to a later date. Additionally, a deferral may apply to the outstanding principal balance. Deferred principal may or may not continue to accrue interest during the period of deferral. Debt deferral is not something a commercial lender prefers, since deferred principal would have to be classified as a nonperforming asset. By "placing debt in the freezer," a lender would be automatically defining it as nonperforming, and federal and state examiners would require that the asset be charged off.

The fundamental underlying assumption of principal rescheduling and deferral options is that the inability to repay debt is a temporary situation that, given time, is correctable at the firm or sector level. The primary difficulty with that assumption is that it rests upon the lender's ability to forecast when, and if, repayment capacity will be restored. In the interim, the lender's cash flow may be substantially reduced, and the risk of loss is increased as the carrying costs of debt accumulate. In that situation a well-diversified lender, or one with a relatively high capital position would be better able to make concessions on principal repayment than a specialized, low-capital lender. Regardless of the lender's position, however, voluntary modification of the principal repayment schedule is not expected to provide the level of relief that highly leveraged farm borrowers need to correct the imbalance between low earnings and high debt repayment obligations.

Illustrations of debt deferral programs can be cited. The Farmers Home Administration has adopted a policy of deferring principal for five years on one or more loans to a farm borrower (Farmers Home Administration). Deferred principal continues to accrue interest during the five-year period at the limited resource loan rate, if the borrower qualifies. Unlike the debt adjustment program (DAP) provisions of 1984–85, the current deferral is not limited in the amount of principal that may qualify. Secondly, the current cash flow test is more lenient,

requiring the operation to generate a break-even level of cash (at a minimum) instead of the 110 percent requirement of the earlier DAP. Some important administrative reforms also have been instituted in the current program.

A second example of principal deferral is provided by the "two-tier" debt restructuring program initiated in 1986 through a memorandum agreement between the state of North Dakota and the St. Paul Farm Credit Services. Federal Land Bank (FLB) mortgages are submitted to the state owned Bank of North Dakota for review. If accepted, the Bank of North Dakota buys a 25 percent participation in the restructured loan. The outstanding mortgage (prior to restructuring) is partitioned into primary and secondary amounts. "Primary principal" is the amount that equals the current appraised market value of the property. Debt in excess of the appraised value is categorized as "secondary principal." All repayment of primary and secondary principal is deferred until the restructured loan matures.

Primary principal bears a below-market rate of 8 percent for years one to three, 9.5 percent for years four to six, and 12 percent for years seven and eight. The FLB rate applies if it is lower than the scheduled rate. Interest on primary principal is prepaid annually and prorated to the Bank of North Dakota and the FLB. However, interest on secondary principal accrues at 6 percent (simple) and payments are deferred until the loan matures. Based on the FLB's variable rate and the decline of land values, some estimates indicate that the annual debt repayment obligation in the early years is approximately cut in half with the program. That reduction is due to the combination of lower rates and deferral of principal and interest payments. A similar two-tier debt program is being implemented in Minnesota and has been advocated by the American Farm Bureau Federation.

Risk exposure of the state and the FLB with the program is difficult to evaluate. If land prices fall below the initial appraised value by the time of loan maturity, the agreement requires that the participating lenders accept the new appraised value as the level of indebtedness and absorb the difference plus any accumulated, deferred interest. The FLB's loss is the sum of (a) deferred interest on primary and secondary principal, (b) secondary principal, (c) primary principal reduction (prorated), and (d) accrued basic interest on primary principal.

Discharge of Debt

The discharge of indebtedness is an alternative to the practice of deferral, where the lender elects to write-off principal immediately instead of postponing its repayment. In that case the lender recognizes that the value of the asset has fallen below the outstanding principal, or the borrower's cash flow situation has deteriorated to a level that prohibits repayment of the current scheduled amount for an indefinite period. Recognition of the inability to repay may occur voluntarily by the lender or be precipitated by an examiner's review.

In anticipation of debt discharge, lenders annually recognize an expense in the form of a provision for loan losses, which offsets net earnings. If the actual write-off of principal exceeds the accumulated allowance for loan losses, the lender's equity position is reduced. Write-offs of nonperforming loans at some commercial agricultural banks have placed them close to (or below) the minimum required capital position during the current period of rising farm loan defaults. Consequently, the equity position of the lender is a strategic constraint to lender adjustments in the debt absorption process.

Direct write-off of the total principal can dramatically increase the probability of bank failure. For that reason, banks have been more willing to attempt restructuring of nonperforming loans by following Financial Accounting Standards Board rule number 15 (FASB-15), instead of direct write-offs. A restructured (or renegotiated) loan under FASB-15 is one in which there may be a legal forgiveness or discharge of principal and/or accrued interest, and the loan is rewritten to place it back on an accrual basis (Johnson). That is referred to as a "modification of terms restructuring." The restructured loan is reclassified as a performing loan, provided the total anticipated future cash receipts under the new terms are at least equal to the principal due. If the amount of indebtedness exceeds the prospective cash receipts, then the lender must write-down the principal due and record a loss.

Renegotiation of a nonperforming loan accompanied by a partial write-down of debt can be used by financially weaker credit institutions instead of a complete write-off with sharp reductions in earnings and equity position. Restructuring under FASB-15 is being used selectively in situations where the farm lender is attempting to follow a course of forbearance to retain farm borrowers. When the amount of principal write-down required to achieve an acceptable restructuring of a loan is too high and prospective repayment is weak, the lender can be expected to write-off the loan and attempt to recover the book loss through legal action.

It is important to recognize that although all of the above options are being used in an attempt to alter loan terms and to increase private sector absorption of excess debt, those options are not equally effective in achieving a long-run solution. The basic objective of altering loan terms is to regain a balance between the amount of debt to be serviced and the debt repayment capacity of those who are in debt. Ultimately, that will require that debt be written off or paid off through asset liquidation and transfer. It is unlikely that farm earnings will recover sufficiently, or soon enough, to have a significant impact on the debt servicing capacity of many highly leveraged borrowers. Secondly, it is not likely that interest rates will fall dramatically for high-risk, high-leverage borrowers in the near future. If it is correct to assume, as does the loan pricing model (Mason; Barry), that the rate charged on loans will continue to reflect costs of funding and administering loans, of risk premiums and associated provisions for loan losses, and of earnings required to rebuild loan loss reserves in future periods, then interest rates will continue to be sticky on the downward side for high-risk farm borrowers.

Modeling Lender Impacts

The impact of financial stress in the agricultural sector on individual lenders is a function of the portfolio composition and performance and of the financial and capital structure of the lending institution. The methodology used here to analyze lender impacts is a microlevel simulation model structured around standard financial accounting concepts, as used by financial institutions.[1] The simulation model is dynamic in nature with a three-year planning horizon, but it is not stochastic. Alternative assumptions concerning loan portfolio composition and performance, as well as financial and capital structure, are introduced into the model to simulate various scenarios.

Description of Model Inputs

Model structure may be best understood by reviewing illustrative input and output summaries. Tables 4 and 5 contain the two basic components of input required by the model. The first component, financial and capital structure parameters, is summarized in Table 4 for two Production Credit Associations (PCAs). Assumptions include interest rates, spreads, operating expenses, overhead, and so forth. Balance sheet assumptions such as initial equity and retained earnings, working capital, loan volume, other assets, and so on are also required as initial conditions. The second component of input is the loan portfolio for three years. Table 5 reflects detailed summaries of the expected performance of two loan portfolios over the three-year planning horizon for different risk categories of loans. Those loan performance projections include expected principal and interest shortfalls based on estimates of the debt-servicing capacity of each customer base.

Two PCAs were selected for analysis due to the availability of detailed financial data, although commercial banks could also have been modeled. Association A is considered to be in a relatively stronger financial position than Association B as illustrated in Table 4. Although Association B has a larger total equity, $23,366,000 of that amount (shown as part of Cash, Investments, and Receivables and as Other Stock) is attributable to a capital infusion that was made through the Federal Intermediate Credit Bank (FICB) to shore-up the association's deteriorating capital position. Association B has a higher spread and interest rate on loans, it finances more than 100 percent of its current loan volume with borrowed funds due to nonrepayment problems, it has relatively higher operating costs due to loan

[1]The method used in this analysis is a modified version of a financial institution simulator developed by Dave Reinders in 1984.

Table 4. Base Scenario Input Assumptions for Two Production Credit Associations

Item	Association A	Association B
Average Interest Rate	11.5%	12%
Average Repayment Rate	35%	35%
Spread	1.5%	2%
Borrowed Funds Paydown	40%	40%
Borrowed Funds as a % of Loans	100%	115.9%
Loan Volume of PCA, Year 1	$99,642,000	$86,543,000
Loan Volume of PCA, Year 2	$98,147,000	$83,081,000
Loan Volume of PCA, Year 3	$96,675,000	$79,758,000
Cash, Investments & Receivables	$14,489,000	$42,540,000
Other Assets	$1,260,000	$1,134,000
"B" Stock, Year 1	$9,557,000	$6,457,000
"B" Stock, Year 2	$9,413,610	$6,198,699
"B" Stock, Year 3	$9,272,425	$5,950,769
Other Stock	$0	$23,366,000
Retained Earnings	$6,192,000	$100,010
Operating Expenses as a % of Loans	1.9%	4.4%
Overhead	$242,000	$160,000
Cash Operating Expenses as a % of Expenses	98%	98%
Non-Borrower "B" Stock	$0	$0
Borrower Excess "B" Stock	$0	$0
"B" Stock Option	1	1
Provision for Losses	1.5%	4%

servicing problems, and it maintains a higher provision for anticipated loan losses.

The parameters in Table 4 are mostly available from individual PCA annual financial projections for 1986–91. The interest rate and spread relationships are based on the current FICB cost of funds (8.5 percent), the FICB spread (1.5 percent), and the average rates in the associations being modeled. The average repayment rate (by farm borrowers) and the borrowed funds paydown rate (of the PCA) are based on the assumptions of a "match funded" loan portfolio. Loans are assumed to carry an average maturity of 2.5 years (three-eighths in five-year term loans and the remainder in one-year operating loans). Loans are being repaid at a slightly slower rate (35 percent per year). That presents a persistent cash flow problem for each of the associations modeled, because the association is required to paydown at a rate of 40 percent per year. Loan volume statistics are initially from PCA financial projections, but are adjusted in years two and three under various scenarios. The line, Cash, Investments, and Receivables, includes primarily accrued interest on loans, and in the case of Association B, reflects a cash infusion that is to be repaid by the association. The provision for loan losses is an estimate of the average volume of nonaccrual loans (as a percentage of total loan volume) that will be written off as a bad debt expense each year during the three years simulated.

Table 5 further illustrates the differences between the two associations. The total farm loan portfolio of Association A reflects less serious classified loan problems than those of Association B. Current loans (classes I and II) initially comprise a greater percentage of total loans at Association A (89.3 percent) than at Association B (60.6 percent). Class III loans (nonaccrual, vulnerable loans) and class IV loans (loans in default; loss loans plus loans in process of liquidation—215 accounts) together represent 39.5 percent of Association B's portfolio and 10.7 percent of Association A's loan volume. Over time, the percentages of total loan volume vary, reflecting changes in loan quality and the loan management strategy of the association.

Interest and principal shortfall are estimated based on the percentage of farm borrowers with negative cash margins before deduction of interest and principal. The strong assumption was made that loan classes I to IV corresponded with farm operator debt-to-asset ratio classes; 0–.1, .11–.4, .41–.7, and .7 or greater. In 1985 it was estimated that from 27 to 50 percent of farm operators had

Table 5. Loan Portfolio Input Assumptions for Production Credit Association A and Production Credit Association B, Base Scenario

Item	Loan Portfolio Class I	II	III	IV	Total
			Production Credit Association A		
First Year					
Dollar Volume	$65,074,000	$23,889,000	$6,211,000	$4,468,000	$99,642,000
Percent of Total	65.3%	24%	6.2%	4.5%	100%
Interest Shortfall	$224,000	$341,000	$74,000	$0	$639,000
Principal Shortfall	$780,000	$1,184,000	$258,000	$4,468,000	$6,690,000
Second Year					
Dollar Volume	$65,074,000	$23,889,000	$6,211,000	$2,973,000	$98,147,000
Percent of Total	66.3%	24.3%	6.3%	3%	100%
Interest Shortfall	$224,000	$341,000	$74,000	$0	$639,000
Principal Shortfall	$780,000	$1,184,000	$258,000	$2,973,000	$5,195,000
Third Year					
Dollar Volume	$65,074,000	$23,889,000	$6,211,000	$1,501,000	$96,675,000
Percent of Total	67.3%	24.7%	6.4%	1.6%	100%
Interest Shortfall	$224,000	$341,000	$74,000	$0	$639,000
Principal Shortfall	$780,000	$1,184,000	$258,000	$1,501,000	$3,723,000
			Production Credit Association B		
First Year					
Dollar Volume	$40,351,000	$12,073,000	$12,073,000	$22,046,000	$86,543,000
Percent of Total	46.6%	14%	14%	25.5%	100%
Interest Shortfall	$145,000	$180,000	$151,000	$1,000	$477,000
Principal Shortfall	$484,000	$599,000	$502,000	$22,046,000	$23,631,000
Second Year					
Dollar Volume	$40,351,000	$12,073,000	$12,073,000	$18,584,000	$83,081,000
Percent of Total	48.6%	14.5%	14.5%	22.4%	100%
Interest Shortfall	$145,000	$180,000	$151,000	$843	$476,843
Principal Shortfall	$484,000	$599,000	$502,000	$18,584,000	$20,169,000
Third Year					
Dollar Volume	$40,351,000	$12,073,000	$12,073,000	$15,261,000	$79,758,000
Percent of Total	50.6%	15.1%	15.1%	19.1%	100%
Interest Shortfall	$145,000	$180,000	$151,000	$692	$476,692
Principal Shortfall	$484,000	$599,000	$502,000	$15,261,000	$16,846,000

negative cash margins before interest within debt-to-asset ratio classes (Johnson et al. 1986). That information was combined with the percentages of total debt at PCAs held by farm operators in those same debt-to-asset ratio classes (Johnson et al. 1986) to determine the percentage of interest and principal that would not be repaid in each loan class due to cash flow shortfalls. The resulting percentages were: 3 percent, class I; 12.4 percent, class II; and 10.4 percent, class III. Class III loans are classified as nonaccrual loans but show an interest shortfall due to interest accrued prior to reclassification. Class IV loans are either loss loans or "loans in process of liquidation," therefore, the entire amount of loans outstanding is principal past due.

Description of Model Outputs

Model output is illustrated in Tables 6 and 7 in the form of annual balance sheets and earnings and cash flow summaries. An annual report for each year of simulated performance is provided so that terminal year financial conditions can be approximated. The condensed standard accounting statement summaries provide the basis for inferences concerning lender performance. By introducing various assumptions with respect to portfolio composition and performance as well as capital structure, the implications of borrower and lender characteristics on lender viability, survivability, and performance can be simulated.

Table 6. Generated Financial Statements for Production Credit Association A, Year 1

Initial Balance Sheet as of January 1, 1986

Assets		*Liabilities and Equity Capital*	
Gross Loans Outstanding			
Current	$88,963,000	Borrowed Funds	$99,642,000
Noninterest Earning Loans	6,211,000	"B" Stock	9,557,000
Loans in Default	4,468,000	Other Stock	0
Net Loans Outstanding	99,642,000	Retained Earnings	6,192,000
Cash, Investments & Receivables	14,489,000		
Other Assets	1,260,000		
Total Assets	$115,391,000	*Total Liabilities & Equity Capital*	$115,391,000

1986 Earnings Statement		**1986 Cash Flow Statement**	
Gross Interest Earnings	$11,458,830	Interest Received	$10,819,830
Less Foregone Interest	639,000	Principal Received	28,184,700
Net Interest Earnings	10,819,830	Less	
Less		Interest on Borrowed Funds	9,964,200
Cost of Borrowed Funds	9,964,200	Borrowed Funds Paydown	37,080,200
Operating Expenses	1,690,297	Cash Operating Expenses	1,656,491
Overhead and Fixed Costs	242,000	"B" Stock Withdrawals	0
Provision for Loan Losses	1,494,630	Additional Funds Borrowed	35,585,200
		Working Capital	14,489,000
Net Earnings	($2,571,297)	*Net Cash Flow*	$40,377,839

Table 7. Generated Financial Statements for Production Credit Association B, Year 1

Initial Balance Sheet as of January 1, 1986

Assets		*Liabilities and Equity Capital*	
Gross Loans Outstanding			
Current	$52,424,000	Borrowed Funds	$100,293,990
Noninterest Earning Loans	12,073,000	"B" Stock	6,457,000
Loans in Default	22,046,000	Other Stock	23,366,000
Net Loans Outstanding	86,543,000	Retained Earnings	100,010
Cash, Investments & Receivables	42,540,000		
Other Assets	1,134,000		
Total Assets	$130,217,000	*Total Liabilities & Equity Capital*	$130,217,000

1986 Earnings Statement		**1986 Cash Flow Statement**	
Gross Interest Earnings	$10,385,160	Interest Received	$9,908,160
Less Foregone Interest	477,000	Principal Received	6,659,050
Net Interest Earnings	9,908,160	Less	
Less		Interest on Borrowed Funds	10,029,399
Cost of Borrowed Funds	10,029,399	Borrowed Funds Paydown	24,981,684
Operating Expenses	2,311,898	Cash Operating Expenses	2,265,660
Overhead and Fixed Costs	160,000	"B" Stock Withdrawals	0
Provision for Loan Losses	3,461,720	Additional Funds Borrowed	20,969,600
		Working Capital	42,540,000
Net Earnings	($6,054,857)	*Net Cash Flow*	$42,800,066

Performance variables include: total assets, total equity, debt-to-asset ratio, nonaccrual and liquidation loans to total loans ratio, total equity to nonaccrual and liquidation loans ratio, net earnings (after provision for loan losses), return on assets, and working capital. Those measures of financial performance will be extracted from year three of each simulated strategy under selected scenarios.

Simulation Strategy

Several loan portfolio management strategies would be interesting to explore. However, some of them would be too complex to model due to the implied accounting treatment and regulations that apply. Because the focus of this paper has been on interest rate reductions and debt adjustment issues, four strategies are explored first in the context of a relatively stable loan portfolio scenario for the two associations.[2]

The baseline strategy (BL) assumes each association is allowed to simply write off a percentage of its class IV loans each year. Each association makes a provision for loan losses to cover the volume written off and defers the balance of class IV loans. Losses are gradually realized over time. Recoveries on loan losses are not reflected in the performance measures. The strategy simply defers loan losses in excess of the standard provision.

An interest rate reduction strategy (IR) reflects the financial impacts associated with an across-the-board reduction in the interest rate charged to farm borrowers. The rate reduction could be the result of participation in a state or federal interest buydown program where the lender's participation requires that it absorb a matched rate decrease to receive a cash transfer. Typically, those rate reductions apply only to farmers in designated debt-to-asset ratio classes. The rate reduction is assumed to be just 1 percent for Association A and 1.5 percent for Association B to reflect the component of interest earnings foregone by the lender after receiving the cash transfer. The rate reduction is modeled by reducing the interest rate shortfall.

A third strategy is for the association to restructure and refinance (R/R) class IV loans (loans in default). Realistically, that policy could, and would, be applied to nonaccrual loans (class III) as well. A policy of restructuring and refinancing those loans could be quite complex to implement in practice, because each loan situation is unique. To model the strategy it is assumed that the association manager writes off a lower percentage of class IV loans in the year of the restructuring or refinancing and takes an equivalent provision for loan losses.[3] A multiple of the provision (four times the provision) is the amount of class IV loans that are refinanced, restructured, and placed back on an accrual basis as a class I loan. In effect the association takes a 20 percent write-off on class IV loans that are recycled. The provision for loan losses under that strategy is about half of what it was under the baseline strategy. In addition operating expenses as a percent of total loan volume were assumed to decline from the baseline scenario level to reflect reduced expenses of servicing and carrying defaulted loans plus some of the legal fees involved in liquidations and foreclosure activity. The reduction in expenses was from 1.9 percent to 1.5 percent for Association A and from 4.4 percent to 3.5 percent for Association B.

The fourth strategy (C) is to combine interest rate reduction (IR) and restructuring and refinancing (R/R). That approach to the debt adjustment problem is anticipated to provide both short-term cash flow relief to farm borrowers in the form of lower interest payments and long term relief in the form of debt reduction.

Two loan quality scenarios are modeled. The first scenario assumes loan quality remains relatively constant over the three years analyzed. The second scenario assumes loan quality deteriorates rapidly between years one and two and deteriorates at a moderate rate between years two and

[2]The greater stability scenario assumes that there is no deterioration of loan quality. Declines in total loan volume are the result of charge offs of class IV loans only, and class I to III loans are not reclassified at lower levels.

[3]The lower charge off of class IV loans reduces the charge off percentage to .75 percent for Association A and 2.5 percent for Association B as percentages of total loan volume. Those levels represent half and five-eighths of the levels in the base scenario, respectively.

three. The intent of the deterioration scenario is to illustrate the potential of the above strategies when loan performance is adversely changing. Only the baseline (BL) and combined (C) strategies are modeled in the second scenario.

Simulation Results

Financial performance measures drawn from the simulated financial summaries for year three are reported in Table 8. A common characteristic for both associations is the continuation of negative net earnings and negative return on assets across all loan management strategies and both loan quality scenarios. That reflects the earnings pressure under which PCAs are currently operating. Foregone interest on nonperforming loan assets, higher than desirable operating expenses, and higher provision for loan losses result in negative net earnings. Working capital of the associations is also under stress due to slow repayment of loans.

Comparison of the interest reduction strategy (IR) with the baseline strategy (BL) for Association A in Table 8 indicates that financial performance is impaired due to the loss of interest income, even though the interest shortfall is reduced. Return on assets declines to -2.83 percent, which suggests that earnings fell more than assets as a result of the strategy. The debt-to-asset ratio increases to 10.2 and the decline in the equity-to-nonaccrual and liquidation loans ratio both reflect the lower equity position.

The restructuring and refinancing (R/R) strategy of debt reduction generates a significantly improved result for Association A. Although still negative, return on assets increased to -1.38 percent and net earnings in year three improved by about $1 million. Total assets and equity show significant increases. The debt-to-asset ratio declined to 7.8 and nonaccrual plus liquidation loans reflect a lower percentage of classified loans. Working capital position in year three is also improved as more loans are placed back on an accrual basis.

The combined strategy (C) reflects the positive impacts of the R/R strategy on all financial measures and the negative impact of the IR strategy. The net result is that earnings are lower than those achieved under the R/R strategy of restructuring and refinancing nonaccrual loans. Equity capital

Table 8. Third-Year Financial Performance for Production Credit Associations A and B

Performance Measure	Constant Loan Quality Scenario				Deteriorating Loan Quality Scenario	
	BL	IR	R/R	C	BL	C
	Production Credit Association A					
Return on Assets	-2.4%	-2.83%	-1.38%	-1.78%	-2.35%	-1.7%
Net Earnings $(000)	-2,571	-2,998	-1,524	-1,958	-2,292	-1,817
Total Assets $(000)	106,996	106,119	110,783	109,903	97,729	106,830
Total Equity $(000)	10,321	9,445	12,620	11,740	9,682	11,566
Debt-to-Equity Ratio	9.4	10.2	7.8	8.4	9.1	8.2
Equity-to-Nonacc. and Liq. Loans Ratio	1.34	1.22	2.03	1.69	.83	1.07
Nonacc. and Liq. Loans-to-Total Loans	8%	8%	6.33%	6.33%	13.3%	11.34%
Working Capital $(000)	9,061	8,184	11,360	10,480	8,422	10,306
	Production Credit Association B					
Return on Assets	-5.29%	-5.98%	-4.16%	-4.83%	-8.05%	-5.52%
Net Earnings $(000)	-5,811	-6,479	-4,829	-5,291	-7,715	-6,046
Total Assets $(000)	109,862	108,433	115,965	114,514	95,868	109,487
Total Equity $(000)	17,431	16,002	20,709	19,257	10,979	17,057
Debt-to-Equity Ratio	5.3	5.8	4.6	4.9	7.7	5.4
Equity-to-Nonacc. and Liq. Loans Ratio	.64	.58	1.67	1.55	.29	.68
Nonacc. and Liq. Loans-to-Total Loans	34.3%	34.3%	15.1%	15.1%	51%	31.6%
Working Capital $(000)	28,970	27,541	32,635	31,183	21,484	28,595

position and measures involving equity capital reflect the net loss associated with the interest reduction strategy.

When loan quality is allowed to deteriorate over time, the financial results of pursuing a mixed strategy (C) of reducing interest rates and restructuring debt provide a sharp contrast with the baseline strategy. The strategy of taking a 1.5 percent provision for loan losses (under the baseline strategy) versus a .75 percent provision under the combined rate-debt adjustment strategy indicates that significant improvements in performance can be achieved in earnings, equity, and working capital by following the latter strategy.

Simulated financial performance measures for Association B are qualitatively quite similar to those for Association A. Comparison of results reported in Table 9 across loan management strategies reflects the improvement in earnings and equity capital position achieved through active debt adjustment and restructuring of nonaccrual loans. Strategy R/R illustrates improvement in earnings (although still quite negative) and larger total assets and equity capital by year three when compared to the BL strategy. The equity capital-to-nonaccrual and liquidation loans ratio increases from .64 to 1.67 under the R/R strategy. Nonaccrual loans as a percent of total loans are cut in half through implementation of a debt adjustment policy. The improvement in financial performance at Association B under the deteriorating loan quality scenarios is also considerable, although a deterioration of the type shown would clearly cause the association to fail given its initial weak financial position.

Conclusions

Four primary conclusions can be drawn from the preceding discussion and analysis.

First, significant costs will be incurred by both the public and private sector because of financial stress in the agricultural sector and rural communities. Those costs include the financial losses of farmers, lenders, business firms, and others due not only to default on debt obligations, lost earnings, reduced collateral and equity values, and reduced general economic activity in rural communities but also the significant transactions costs (litigation expenses, lender and borrower time allocated to renegotiation, increased documentation requirements, and so on) associated with the resolution process. Nonfinancial costs include stress imposed on and the misallocation and underutilization of human resources in agriculture (including farmers, lenders, agribusiness, community, social and government agencies, and so forth) that are a result of the adjustment process.

Second, public assistance to resolve financial stress in agriculture may be appropriate, but it is essential to recognize that (a) substitution of public sector for private sector debt will do little to solve problems that result from too much debt; (b) the public sector has limited financial and resource capacity to assist with the problem; (c) any public sector assistance program will be difficult to implement in an efficient and equitable fashion; and (d) if a program is implemented, it must be targeted to be cost effective, which will clearly compound problems of implementation and raise questions of equity.

Third, altering loan terms by writing down interest rates or modifying the debt repayment schedule provide only limited opportunities to resolve financial stress for the most severely stressed farmers. For most producers under severe financial stress, the problem appears to be excessive debt, and only a combined strategy of altering loan terms and writing off part of the existing debt appears to have much potential as a long-term solution. Because of the high-leverage and low-equity capital base of many lenders they have limited capacity to absorb the losses associated with debt write-offs. That limited capacity to absorb losses constrains the ability of the lender to solve the financial problem and delays the resolution process. In many cases, the losses will compound as time is used to extend absorptive capacity. For those producers with moderate debt loads and encountering moderate financial stress, a reduction of interest rates appears to be a more effective strategy for resolving financial stress than modifying the principal repayment schedule.

Fourth, the method of managing nonperforming debt is critical to the continued

viability of a lending institution. If the lending institution has the capital base to do so, restructuring nonaccrual loans and placing them back on an accrual basis, even if significant write-offs must occur, is a preferred alternative to reducing interest rates in an indiscriminate fashion. In general, rate reductions do not generate adequate benefits in terms of loan performance to offset the costs in terms of lost earnings, unless they are combined with debt restructuring and the write-off of the nonservicable portion of a debt obligation. A secondary benefit of debt restructuring is to reduce the volume of assets being liquidated and the pressures on the asset markets when the absorptive capacity of those markets is limited.

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Programs to Alter Lender Risks

David Lins, Mark Drabenstott, and John Brake

Commercial lenders face significant risks in lending to agricultural producers—risks that have mounted in the 1980s. Risk originates in the inherent financial structure of the lending institutions, in the nature of agricultural operations that they finance, and in factors outside the control of farmers or their lenders. This paper will identify the nature of risks faced by agricultural lenders; the rationale for programs designed to alter lender risks; criteria for evaluating public policies and programs; and the various policies and programs designed to alter lender risks and the expected impact of such policies and programs on farmers, lenders, consumers, and taxpayers.

Types of Lender Risk

One type of risk associated with lending arises from the inherent financial structure of lending institutions. Commercial banks and Farm Credit System banks typically have been highly leveraged institutions—leverage ratios of eight-to-one or higher are not uncommon. A rationale for allowing such high leverage is that the degree of total risk faced by lending institutions was perceived to be relatively low. The two principal risks farm lenders have faced in the last five years have been interest rate risk (brought on by deregulation) and portfolio risk (caused by the deep farm recession). With proper asset/liability management, financial intermediaries may effectively offset the risks associated with fluctuating interest rates. Variable interest rate loans were seen as another factor that strengthened the ability of financial institutions, especially the Farm Credit System, to avoid interest rate risks. While interest rate risk has been effectively offset, recent experiences at rural commercial banks and Farm Credit System outlets suggest that financial reserves have not been adequate to cover losses arising from other forms of risk.

Other risks faced by lending institutions include: nonperforming loans, loan delinquencies, and defaults; deteriorating collateral values that increase losses on assets acquired through foreclosure; mandated or forced sales of acquired property; mandatory rapid write-off of potential or likely loan losses; impairment of existing contracts (foreclosure moratoria and mandatory mediation); and lack of diversity in the loan portfolio.

Some of the risks identified above are within the control of the lender while others result from factors beyond the control of the lender or farmer. For example, the rapid decline in land values in many areas of the country could not be foreseen or controlled by farmers or their lenders. The issue is how to best deal with risks that substantially exceed the levels anticipated when reserve requirements were established and when loan contracts were entered into by farmers and their lenders.

Another important issue in the current economic environment is the degree of portfolio diversification by agricultural lenders. That is most evident in the Farm Credit System where nearly the entire loan portfolio consists of agricultural loans. Although loan diversification would do little to solve the current financial problems of the Farm Credit System, some have suggested that diversification of the loan portfolio is needed to prevent similar problems in the future. Likewise, many small rural banks hold loan portfolios dominated by farm and/or agribusiness loans. To the extent that the local economy is tied to the health of the farm sector, those banks find it difficult to diversify. The move toward multibank holding companies with member banks spread over a wide geographic area may be one response to that form of risk.

David Lins is professor of agricultural finance at the University of Illinois. Mark Drabenstott is research officer and economist at the Federal Reserve Bank of Kansas City. John Brake is the W.I. Myers professor of agricultural finance at Cornell University.

Rationale for Policies and Programs to Alter Lender Risks

Subsequent sections of this paper will highlight a variety of public policies and programs that have been developed to eliminate and/or reduce the risks faced by lending institutions serving agriculture. The purpose of this section is to review the rationale for such public policies and programs.

One rationale is to save lenders from failure and to protect the equity capital holders from financial loss. The justification for intervention lies in the belief that problems faced by lenders are not of their own making and therefore lenders should not be totally responsible for bearing the brunt of the problem. However there is little public support for such a rationale. Many argue that offering public assistance to agricultural lenders cannot be justified unless lenders to other troubled sectors, such as energy, also receive assistance. Some take exception to the equity capital of the Farm Credit System that exists in the form of borrower stock. In that instance, there appears to be strong public sentiment to protect stockholders from loss.

Another rationale for reducing lender risk is that such action will result in a continuous supply of debt capital to borrowers. The welfare of farmers, not lenders, is the justification. Granted there may be some indirect benefits to the lender, but the ultimate goal is to help farmers maintain adequate and low-cost sources of debt capital. Public sentiment for that rationale appears to be quite strong.

Some public policies and programs designed to alter lender risk are attempts to encourage special purpose lending. For example, some loan guarantee programs offered through state governments have been available only for loans for specific purposes. Illinois, for example, has passed a law that provides guarantees on loans made to farmers and/or agribusiness firms that are engaged in the production of new agricultural products not typically grown in the state. The attempt here is to encourage lenders to provide loan funds to new, high-risk ventures that are expected to promote new forms of agricultural production.

Another rationale for public policies and programs to alter lender risks is to offset or slow market forces. Examples include foreclosure moratoria and mandatory mediation laws. Such public policies and programs tend to increase lender risks by making it less certain how quickly or under what conditions loan collateral can be acquired in case of delinquency. The rationale for such programs is clearly one of giving farmers more time to work out of their current financial problems by preventing or delaying foreclosure actions. Undoubtedly, the recent enactment of a Bankruptcy Chapter 12 for farmers is another example. Justification for such actions is typically based upon the belief that current financial problems of the farmer are temporary. Another justification for such actions appears to be the belief on the part of some that the ultimate failure of lending institutions is not all bad if it sends a signal to legislators about the severity of financial problems in agriculture.

Criteria for Evaluating Programs to Alter Lender Risks

Analysis of benefits and costs are basic to program evaluation, but long-term resource efficiency and future benefits or losses are also relevant. Discussion of various benefit-to-cost criteria for evaluating public programs draws upon previous work by Harl (1986) and Brake.

Benefits of public programs can be measured in many dimensions—dollar amounts, number of borrowers affected, and others. But, because of secondary effects, the full extent of program benefits is often not quantifiable. Consequently, delineating benefits and benefit recipients is often difficult.

It is not necessary for a program to be aimed at lenders to reduce lender risks. For example, a program of intervention that improves the financial situation of large numbers of farm borrowers will obviously benefit lenders. Likewise, programs that benefit lenders may also benefit borrowers.

Two opposing principles seem paramount in discussing program benefits. One is to target benefits so that those most in need receive most or all of the benefits. A major criticism of commodity programs, for example, is that large benefits go to large farm operations already competitive and profitable. An equity principle, however, stands at odds with the targeting principle. In general, equity among borrowers and among lenders is desirable. Policy attempts to help as many needy borrowers as possible. But a cutoff point must be chosen. Borrowers from one lending agency should be treated equally to those borrowing from another. And, if one farm lender receives public assistance, perhaps comparable assistance should be available to its competitors (and borrowers of its competitors). Targeting is desirable to maximize results per dollar invested, but equity is also important for wide acceptance and support of the program.

The cost side also has many facets. Public and private costs of program implementation are critical, especially in an era of federal and state fiscal austerity. Direct taxpayer costs are kept before the public by the news media. Yet, such costs must often be estimated based on assumptions of future changes in input costs, farm output prices, and government programs. Similarly, current and future costs to consumers, though difficult to estimate, need consideration.

The degree of government involvement and means of implementation affect costs. It is important to evaluate whether a new agency, institution, or entity is necessary or if an existing unit can carry out the program. The Farmers Home Administration (FmHA), for example, is often assigned to carry out new programs but often does not receive the funds for additional administrative personnel to do so. Implementation time may be dependent on whether or not an existing agency can be utilized. The time dimension of costs needs consideration, too. Some programs are especially costly in the first year with smaller annual charges later. Others generate costs that are spread more evenly over the life of the program.

Costs of programs to private lenders deserve explicit consideration. A program will be used less if it is too costly either in direct costs or in lender time required to qualify for benefits. Private lenders will apply their own perception of the benefit-to-cost ratio in deciding if they or their borrowers will use the program. Lower public and private costs are both important criteria.

A related issue is whether the public would share in any benefits from an agricultural sector "turnaround." Past programs have given little attention to that cost; that is, increases in asset value have belonged to the asset owner—usually the borrower. Harl (1986) raises two questions concerning possible future increases in asset values: (a) . . . "to what extent the public should participate in any increases in land (and other asset) values to the extent, at least, of . . . public funds advanced," and (b) "whether a charge should be made for the use of public funds." Those questions apply whether public funds are provided to borrower, individual lender, or lending system. Future recapture or reduction of public costs by such means would directly affect the benefit-to-cost ratio of the program.

Finally, an important criterion is whether the program encourages appropriate resource adjustment and market efficiency. Short-run programs that encourage marginal resources to stay in production when overall resources need to move out of agriculture seem questionable. Programs should encourage adjustment consistent with long-term market fundamentals. Although there is a trade-off between long-run resource adjustment (including economic efficiency) and social considerations, programs should aim for consistency with long-term economic realities. To do otherwise prolongs the adjustment and makes it more costly.

Public Policies and Programs to Alter Lender Risk

In this section the major public policies and programs that have been used to offset lender risks are identified. The format of presentation will be the same for each policy or program. First, the policy or program is described. Then the rationale for the policy or program is discussed. Next, any policy impacts on borrowers and lenders and the public costs of the programs or policies are identified. Finally, a subjective evaluation of the effectiveness of the policy or program is provided.

Loan Guarantees

A commonly used mechanism to offset lender risks associated with agricultural loans is loan guarantees. Under that approach, either the state or the federal government will provide a guarantee against loan default for qualified borrowers. Loan funds and loan servicing are provided by the commercial lender. Usually there is some small fee charged by the government to put the guarantee in place. The amount guaranteed is normally a large percentage of the full loan amount—usually 85 to 90 percent.

Most of the guarantee programs for agricultural loans have been administered through the FmHA. Loan guarantee programs now exist for farm ownership loans ($300,000 maximum) and farm operating loans ($400,000 maximum). To participate in the program, borrowers must normally be considered too strong to qualify for a direct FmHA loan. Several states have also offered loan guarantee programs.

Loan guarantee programs quite often have been tied to some other program, such as an interest rate buydown or debt restructuring. The rationale is that the guarantee will provide an adequate incentive for the commercial lender to restructure the loan or to bear part or all of the cost of the write-down of interest. The intended beneficiary of the loan guarantee, however, is clearly the farmer. However, in some instances lenders have found it quite beneficial to participate in the program for reasons other than reduced risk on loans. In some cases lenders have enhanced their profits by selling the guaranteed portion of the loan into the secondary market.

There is little evidence of how FmHA loan guarantees impact lender and farm borrower performance. It seems likely that the loan guarantees have allowed some farmers to remain in agricultural production who might otherwise have been forced out due to lack of financing. From the lenders perspective, it seems likely that some losses they would have incurred have been offset by payments made under the guarantee program.

A study by Burk and Lins did evaluate the impact on grain farmers who did or did not participate in a debt restructuring and loan guarantee program offered through the state of Illinois. Results of that study suggested that participation in the program: (a) significantly improved cash flows but did little to improve net income or net worth of farmers, (b) did little to increase the long-term chances of survival in agriculture for highly indebted farmers, and (c) was of some benefit to farmers with modest degrees of financial stress. In some cases, participation actually caused net income and net worth to decline.

There has been little information or analysis of the public sector costs of loan guarantee programs. However, federal legislators have strongly encouraged FmHA to guarantee loans rather than make direct loans, at least in part, because loan guarantees cost less than direct lending (Norris).

Most of the work on estimating the impacts of loan guarantees has been conducted by the Congressional Budget Office. In theory, the subsidy or spending equivalent cost of a loan guarantee is the single-payment premium that would be charged for such a guarantee by a competitive, actuarially sound insurer. Other costs associated with loan guarantees include the cost associated with the misallocation of resources that can occur if loan guarantees encourage lending activities that would not take place in a totally competitive market environment. At present, it appears that the costs of federal loan guarantees are not adequately reflected in budget estimates. Consequently, the costs of such guarantees tend to be underestimated by policy analysts and legislators.

Government Acquisition of Problem Loans

At present, there are no federal or state programs designed to reduce lender risks by government acquisition of problem loans. Some might argue that the acquisition of problem loans from commercial lenders by the FmHA has served that function. Although it is true that a movement of problem loans from commercial lenders to FmHA has occurred in the past, that alternative for dealing with problem loans has been greatly diminished in recent years as Congress has attempted to slow the surge of FmHA lending. From time to time there have been proposals for the creation of special government entities to assist with interest

payment on problem loans held by commercial lenders. For example, Harl (1985) suggested the formation of an Agricultural Credit Corporation (ACC) that would allow the federal government to make part of the interest payments on problem loans in exchange for a principal or interest rate write-down by the lender. Suggestions for implementation were outlined by Harl and will not be repeated here.

The need for such public intervention was based upon Harl's contention that: "The amount of assets involved (in problem loans) is likely to impact land and machinery markets sufficiently to make public intervention necessary if serious economic damage to the fabric of rural communities is to be avoided." The underlying rationale then is that avoiding human trauma and maintaining the structure of rural communities justifies public intervention. In addition, Harl suggested that such intervention "should be viewed as in keeping with the longstanding tradition of policies to assure the private holding of farm assets on a basis of widespread ownership."

The cost of such intervention is highly dependent upon the future direction of asset values. If asset values increase over the life of the intervention, public sector costs would be minimal. In contrast, if asset values fail to increase, Harl estimated costs at $6.8 to $9.2 billion depending upon the level of participation. An important determinant of the program's final cost would be the length of time the ACC would have to hold the loans and the underlying assets. It is quite possible the time could be longer than expected thereby adding significantly to the program's total cost to taxpayers. Thus we can see that the program would tend to shift the risk of continued declines in agricultural asset values from participating borrowers to the general taxpaying public.

Infusion of Equity Capital—Capital Adequacy Programs

Maintaining adequate capital has been a critical concern for both farm lenders and their regulators as problem loans have mounted. Commercial farm lenders built up large capital reserves out of strong earnings throughout the 1970s. As the 1980s began, then, capital positions were very sound, and in aggregate, agricultural banks continue to have adequate capital. But a growing number of individual banks have total capital less than total problem loans.

For commercial banks, three types of programs to maintain adequate capital have been proposed or implemented: accounting measures, regulator forbearance, and relaxing bank merger laws.

Accounting measures. Some banks have proposed net worth certificates (NWCs) as one accounting measure to boost capital. NWCs are capital certificates that regulators authorize financial institutions to use for a predetermined amount of time. In effect, they are "paper capital." The rationale for NWCs is that they give lenders time to weather economic storms and to eventually bounce back from current financial difficulties. Implicit in that rationale is the assumption that agriculture's problems are cyclical. That is, bad times for agriculture today will give way to better times tomorrow, a rebound that will restore stability and higher earnings to farm lenders. The certificates can be withdrawn when the banks are stable once again.

Loan loss deferral programs have been proposed on the same grounds. Earlier this year, the American Bankers Association and the Independent Bankers Association proposed that agricultural banks be allowed to write down farm loan losses against capital over a ten-year period rather than in the year the loss occurs, as current law requires. Loss deferral, like NWCs, is premised on an economic upturn in the farm sector. The basic argument is that if banks are given flexibility now, they can earn their capital back in the future, when bank earnings will be higher due to a rebounding farm sector.

In theory, NWCs and loan loss deferral programs appear to offer clear benefits to farm lenders. The primary benefit is to provide more time for lenders to restructure loans and work through problems. Foreclosures, in particular, could be forestalled to a considerable degree. Direct costs in either approach appear small, since each only represents boosting bank capital on paper.

In practice, NWCs and loan loss deferral programs are not nearly so attractive.

Evidence is mounting—in the form of tremendous crop surpluses—that agriculture's problems are secular and fundamental, not cyclical. Thus, either approach would likely have the practical effect of postponing inevitable farm loan losses, and in some cases, even making the eventual losses bigger. NWCs and loan loss deferral also necessitate accounting changes that do not accurately portray a bank's capital position to either depositors or investors. Finally, NWCs were used in the savings and loan industry in the late 1970s, and most analysts agree that they failed to stave off serious financial problems for the industry.[1] All three bank regulators oppose NWCs or loan loss deferral programs—with one exception, the use of Financial Accounting Standards Board (FASB) rule 15.

In effect since 1977, FASB rule 15 is applicable to any type of loan, and all three bank regulators have supported its use for farm loans. Essentially, the rule allows banks to restructure a problem loan and avoid current recognition of the loss. The loan could be restructured by extending the maturity, foregoing some principal, reducing the interest rate, or some combination of the three. The key is that both lender and regulator must agree that there is a reasonable prospect that the restructured loan can be repaid. In effect, the bank exchanges some reduction in current capital for future reductions in earnings. The net effect of the rule, then, is that it gives lenders time and flexibility to work through troubled loans, although lenders eventually bear the cost of the initial principal reduction.

Agricultural banks have made very little use of FASB rule 15. Apparently, banks are not familiar with the accounting requirements. In addition, banks are reluctant to take the initial principal write-down that is often required for the loan to cash flow. In that regard, banks have shunned FASB rule 15 in the same way they have turned aside from other programs that required some up front principal forgiveness, such as the Debt Assistance Program. Nevertheless, FASB rule 15 represents a low-cost, efficient means of buying time to work through problems, and its use may increase as regulators continue to encourage such restructuring.

Regulator forbearance. Another approach to capital adequacy is forbearance by regulators. In spring 1986, the three federal bank regulators announced a capital forbearance program.[2] The key portion of the plan is to allow a bank's capital to fall below 6 percent, and as low as 4 percent, without penalty. To qualify for that forbearance, banks must meet the following conditions: agricultural and energy loans must aggregately be at least 25 percent of total loans, the weakened capital position cannot have resulted from significant mismanagement, and a plan to restore capital to normal levels over a reasonable period of time must be filed.

Capital forbearance by regulators is a low-cost, visible means of addressing the capital problem of farm banks. It does not use accounting measures that distort the true strength of the institution. It does require banks and regulators to evaluate, on a case by case basis, whether an institution has a reasonable chance to rebuild its capital position. Finally, it gives lenders flexibility to work through problem loans with the added discipline of restoring capital over time.

Unfortunately, the capital forbearance program has seen little use. Through midyear, only thirty-one banks supervised by the Comptroller had applied for the program, and the Federal Reserve and Federal Deposit Insurance Corporation (FDIC) report similar experience. Apparently, most agricultural banks have reported capital that is either sufficient or well below standard, leaving few that were marginal and thus candidates for the program. Banks may be slow to write down problem loans; so when regulators do require write-downs, capital erodes too fast for the forbearance program to be meaningful. The problem might be corrected by more realistic write-downs by banks themselves in conjunction with improved communication with regulators while planning the use of the forbearance program.

[1]For an analysis of the effects of NWCs in the savings and loan industry, see General Accounting Office, "Thrift Industry and the Net Worth Certificate Program," GAO/GGD-85-79, and "Thrift Industry: Net Worth and Income Capital Certificate," GAO/GGD-86-100FS.

[2]See joint statement of the Federal Reserve Board, the Federal Deposit Insurance Corporation and the office of Comptroller of the Currency on Regulatory Policies Toward Agricultural Lenders, March 1986.

Relaxing bank merger laws. Another approach to capital adequacy is to relax banking laws to allow branching and/or interstate banking. Historically, many farm states have had unit banking laws, or have severely restricted branching. With large numbers of problem and failing banks, many states have re-evaluated their banking laws. The result is that thirteen states have rewritten bank laws in the past two years to allow failing or failed banks to be acquired as branches of banks within the state. Another twenty-six states have rewritten laws to allow failing or failed banks to be acquired by out-of-state banks.

Bank laws that facilitate the sale of failed or failing institutions are one way to allow the market to boost the capital of troubled institutions instead of the public. All three bank regulators support state and federal legislative efforts to facilitate bank mergers. Most mergers appear consistent with the goal of efficiently providing capital to the farm sector, and there is little if any compelling evidence that concentration of agricultural banking assets would lead to reduced capital flow to agriculture.

Farm Credit System capital adequacy. The Farm Credit System has also suffered a rapid erosion of its capital in the past three years. The Farm Credit Act Amendments of 1985 created two mechanisms for maintaining the system's capital. First, the FCS Capital Corporation was formally recognized as the tool for marshaling the system's capital. That corporation, with FCA rules now in place, has the authority to tap the capital resources of any of the thirty-seven banks in the system and to use those funds to acquire the problem loans of other banks in the system. In short, the Capital Corporation serves as the workout bank for the entire system. Nonperforming loans are channeled to the corporation which services and arranges workouts and—if necessary—liquidates them. Second, the legislation established a backstop system line of credit with the Treasury. The credit will be triggered when the FCA certifies that the system has a need for such capital.

The two provisions should be effective in making full use of system capital resources and injecting public funds when needed. A few basic questions remain, however. The Capital Corporation has been extremely slow in becoming operational while problem loans continue to mount across the system. Thus, its ability to pool resources remains unclear, especially in the face of lawsuits that dispute its right to tap the capital of healthy districts. For system self-help measures to be thorough and effective, the Capital Corporation will need to be operating efficiently soon. The timing of Treasury assistance remains another much debated issue. Some argue that the system will undergo unnecessary structural change if assistance is given only when system capital is gone, while others continue to argue that Treasury assistance to only one farm lender is unfair. The effects of Treasury assistance on the long-run competitiveness of the system remains an unanswered question, although the outcome will have lasting effects on the provision of credit to the sector.

The Farm Credit Act Amendments of 1985 may be superseded by important legislation quietly passed as the 99th Congress adjourned. The legislation cosponsored by Representative Ed Jones and Senator Thad Cochrane, was attached to the final omnibus budget resolution (H.R. 5300). The plan includes three key provisions. First and most important, FCS banks can, subject to Farm Credit Administration (FCA) approval, amortize "unusual" loan losses over a period of up to twenty years. Unusual is defined as losses that exceed 0.5 percent of all outstanding loans. Second, FCS institutions can, subject to FCA approval, "refinance" long-term debt and spread the cost of the resulting transaction over twenty years. The "refinancing" occurs only on paper and does not actually involve any recall of system bonds. Third, FCS institutions are given greater independence from the FCA in setting interest rates.

The net effect of the legislation is that it gives the system more time to cope with its large current and prospective loan losses. But that time is bought only through the use of regulatory accounting. The losses will still be there, they simply will not appear as large. The legislation also means that interest rates are likely to decline for FCS borrowers. Overall, the new plan may negate the need for government assistance provided for in the 1985 amendments and may also have the

effect of slowing structural change in the system. It remains to be seen, however, how current and prospective FCS bond investors will respond to the accounting changes. Also, Congress probably will be under more pressure to give agricultural banks the same accounting privileges the FCS now enjoys.

Asset Purchase Programs

Another proposed approach to farm lender problems is a specially chartered federal corporation whose sole purpose is to purchase farm land to stabilize its value. The overall objective of that approach is to stem the erosion in farm balance sheets making loan workouts easier for both borrowers and lenders. If land values were to be stabilized, all parties involved would have firmer footing and more time in which to resolve farm loan problems.

Two basic asset purchase programs have been proposed. The Farm Credit Council (1985) proposed an Agricultural Conservation Corporation (ACC). The ACC would fund farm land purchases through the issuance of federally guaranteed bonds and stock equity capital from land sellers. Farm land sellers would have preference in the leasing of property and would have right of first refusal when land was sold. The ACC would have to sell land at the end of ten years—the life of the corporation—or sooner if land prices recovered to 115 percent of purchase price. Harl (1986) has proposed an institution with similar features. One advantage of the proposals is that all borrowers (hence, all lenders) would be treated alike instead of banks and FCS each having to establish its own entity.

In theory, the ACC proposal offers important benefits in the form of more stable farm credit conditions; in practice, major questions remain. First, the time for creating an ACC may have passed. Farm land values across much of the farm belt are already off more than half from market highs, and land values may now be stabilizing. If values are starting to firm in the market, is a government-chartered entity needed to bring about further stability? Second, political pressures might cause the corporation to support farm land values higher than market fundamentals dictate. Third, the working limits of the ACC remain unclear. Lins and Burk demonstrate that careful limits are needed to determine which farms are acquired, because healthy borrowers could receive unneeded benefits from the sale of land, while severely leveraged farmers may only postpone an inevitable exit from business. Fourth, the ACC would need federal legislative authority to purchase farm land in those states, such as Nebraska, that prohibit corporate ownership of farm land. Finally, if a corporation were established to purchase troubled agricultural assets, political pressure would be strong to authorize purchase of assets in other troubled sectors, such as energy and commercial real estate.

In short, there seems to be little justification now for an ACC. The main justification of that approach is to prevent farm land values from undercutting the values the market would support. Land values now appear to be stabilizing on their own, and if further stability is needed, a less costly approach for the public may be to make it easier for farm lenders to hold acquired property for longer periods of time.

Other Proposals

In addition to the options discussed earlier, numerous other proposals and variations have been suggested. Although all possible options need not be discussed, several deserve mention because of their uniqueness or the problem they address. Those include merger of institutions, subsidizing rental returns to lenders who rent foreclosed land back to former owners, changes in tax laws to encourage farm liquidation by strapped operators, and establishment of a secondary farm mortgage market.

Mergers (or acquisitions) have been one response to financial stress by lending institutions. As mentioned above, bank regulators have encouraged strong financial institutions to assume assets and liabilities of troubled or failed banks. That approach continues provision of financial services to the local communities, and it has the effect of spreading the portfolio risk over a broader base. Similarly the Farm Credit System has merged local Production Credit Association (PCA) and/or Federal Land Bank Association (FLBA) districts with nearby districts where equity capital was strained. Such mergers provide a degree of geographic

diversification of risk, a broadened equity base, and to a lesser extent, perhaps, some efficiencies of operation.

Another policy proposal is for the U.S. Department of Agriculture (USDA) or FmHA to subsidize the return to farm assets held by lenders. A subsidized payment on such assets could encourage lenders holding such property to rent the assets back to the previous owners. The terms of the payment might even require the lender to give the previous owner first right of refusal when the property is offered for sale. The main purpose, of course, would be to improve the returns on such assets for the lender.

A secondary market for agricultural loans is receiving considerable attention. Presumably the approach would be similar to FNMA (Fannie Mae) which buys residential mortgages, packages them, and sells them to investors. An "Aggie Mae" would have merit over the long term as a means of adding liquidity and competitiveness to the farm real estate market. However, it would likely need loan guarantees or loan insurance to be operable and helpful in this particular period of farm economic stress. Exchanging one source of debt for another is not likely to solve the problems of an overindebted sector.

Still another approach to improving farm loan capital markets may be to provide commercial banks open access to Farm Credit System funds. In that case, the Farm Credit System would become more of a wholesaler of capital to agriculture, and banks would simply become additional retail outlets.

Changes in tax laws to encourage asset liquidation by financially troubled farmers could also be helpful in reducing lender risks. Some low equity farmers delay liquidation because of concern over tax consequences. The delay leads to loss of their equity and losses to their lenders. Often the tax consequences of voluntary liquidation force the debtor to choose bankruptcy, and that choice can lead to lender losses as well. For a more complete discussion of tax law changes to encourage asset liquidation, see Lins and Klinefelter.

Those and many other proposals have been offered. The problem, however, is not so much in getting ideas for improving borrower or lender risk as it is in evaluating the proposals in an objective and timely manner.

Direct Federal Farm Lending and Farm Lender Programs

Regardless of which approach policy makers take in addressing farm lender problems, their decisions on direct federal farm lending will have important effects on the outcome. The federal government has become a major lender to agriculture, especially through the FmHA. In 1984 and 1985, the FmHA extended $4 billion and $4.8 billion, respectively, in direct farm loans. With such volume of direct loans available to financially troubled farm borrowers, commercial lenders have eagerly routed their most troubled loans to the FmHA. Thus, it is not surprising that lenders were reluctant to use the Debt Assistance Program, which required some initial write-down of principal, when they could successfully send troubled credits to the FmHA for loans.

Farm lender programs aimed at altering risk, therefore, need to be coordinated with direct farm lending programs. If the FmHA is going to phase out direct loans in favor of loan guarantees, as the 1985 Farm Bill directs, then that will encourage lenders to participate in programs in which they share part of the cost of restructuring. On the other hand, if a steady stream of FmHA direct loans is forthcoming, commercial lenders will almost certainly send their worst customers to the FmHA. Another unanswered question involves the effect of mounting volume of CCC loans and how that affects farm lenders. In 1984 and 1985, the CCC lent $6.9 billion and $11.2 billion, respectively. Much of that lending occurred in the prime farm lending period—the fourth and first quarters. How the surging volume of CCC loans alters the decisions of farm lenders, especially decisions about troubled loans, is becoming a more important question but one that remains unstudied.

Summary and Conclusions

Farm lenders face a variety of risks. The current problem is that risks exceed levels anticipated when equity requirements were set and loan terms were arranged. The predominance of agricultural loans in the portfolios of many rural banks and the Farm

Credit System becomes a serious problem in periods of substantial and widespread sector economic decline such as the 1980s.

A number of policies and proposals have been suggested to deal with lender risks and have been discussed in this paper. Many of the proposals made in the past year or two seem to assume that the recent and current economic problems of agriculture are short term so that temporary or short-term policies will suffice until times improve and/or land values again inflate. Loan guarantees, government acquisition of troubled loans and the associated assets, capital adequacy programs, and warehousing-workout special purpose corporations are somewhat dependent on a turnaround in the agricultural economy.

Loan guarantees improve cash flow, but there is little evidence of their effectiveness in bringing about improved long-run survival of either borrower or lender. An entity to acquire problem loans and the associated assets might have been effective if implemented earlier—and may be useful yet if the sector continues to experience asset deflation. Capital adequacy programs tend to "paper over" problems through changes in accounting entries that give institutions and borrowers more time to deal with their problems. Such programs may help if economic conditions don't deteriorate; they won't help much if conditions do continue to deteriorate.

Some of the responses that seem to have merit probably also have limited applicability. For example, FASB rule 15 allows loan restructuring such that less lender equity is lost. Regulatory forbearance may allow lenders at the margin to fall below equity standards without penalty in certain circumstances. Bank and lending association mergers allow loan portfolio diversification using a broadened equity base. While all of those have merit and are not costly to implement, they do not have the potential to meet massive sector problems.

Finally, there is a need for the government to clarify its future role in direct lending. As a major force in agricultural finance markets, its programs need coordination with other policies to deal with borrower and lender risks.

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Educational and Social Programs as Responses to Farm Financial Stress

Bruce L. Jones and William D. Heffernan

The recent declines in the value of U.S. farm assets have resulted in significant financial losses for U.S. farmers. Some farmers have seen most if not all of their wealth disappear in a few years. Others have been forced out of business because their lenders were no longer willing to supply the credit they needed to stay in business.

It is unfortunate that some farmers go out of business. That is clearly an undesirable outcome, but it is unavoidable in a capitalistic system when supplies of products are increasing faster than demand. Government can provide economic assistance to prevent the failure of farm businesses in the short run. However, over time the cost of farm economic assistance programs will compound as market forces try to bring supplies in line with demand. When the costs of those programs rise above acceptable levels, it will become financially impossible to prevent some farm business failures. As that has become more apparent, some policy makers have considered educational and social programs that would help financially stressed farm families cope with the financial or emotional problems they could experience. Some of those programs primarily benefit farm families who leave farming while other programs are most beneficial to those trying to stay in business.

Educational and social programs are not widely understood because they have generally not been used or needed before. Therefore this paper's purpose is to identify and discuss some of the unique programs that could be used to help farmers cope with emotional and financial problems resulting from financial stress. Six possible programs considered here are: information assistance, emotional support, legal assistance, financial counseling, vocational assistance, and financial assistance to exiting farmers. It is hoped that a discussion of such programs will make more policy makers aware of alternative responses to farm financial stress.

Information Assistance

In a recent study of families forced out of farming for financial reasons, only five of forty families (12 percent) could think of any assistance they received from a government agency, church, or any other organization during their transition from farming. There were many government and nongovernment programs and people available in the community to help families at such times, but the services were not used. Although there were undoubtedly several reasons why the current programs were not used, the major reasons included the following: families and individuals experiencing extreme stress tend not to reach out for assistance, the former farm families are proud people who feel they can provide for their own needs, and the families were not aware of the services available in their areas because a major effort must be made to obtain and access such services. When asked what assistance was most needed, one of the most frequent responses was a centralized place to receive information.

A major effort must be made to make current programs more accessible to the persons in need of them. Many states and communities have recognized that need and have begun to publish and distribute service directories that list the various programs available in a state or a community. Some programs are not available in every community but are available at a state level. Frequently, the state level programs are supplemental to the local community services.

Bruce L. Jones is an assistant professor of agricultural economics at the University of Wisconsin-Madison, and William D. Heffernan is a professor of rural sociology at the University of Missouri-Columbia. The authors thank R. M. Klemme for his useful comments, and they assume responsibility for any errors that remain in the paper.

Unfortunately, those directories often do not get into the hands of those who are most in need, and often the persons in need are still unable to reach out and ask for assistance. In some communities, clergy, social workers, and others have made an effort to personally contact and discuss available services with families who might need such assistance. In many cases, the formal service directory is used more by other service providers than it is by the farm families.

One of the major benefits of developing local service directories is that it provides an opportunity for persons delivering the social services to become familiar with other local programs and the personnel who administer those programs. Often, a former farmer will contact a local extension person, a pastor, or others and indicate some of the problems faced by farm families. Such individuals are unlikely to contact the food stamp program or a mental health clinic both of which have a stigma in rural areas. A major effort must be made to make sure that individuals who do reach out to helping professionals in one organization are automatically folded into a system that provides the numerous other services. In most rural communities, the personnel in organizations that have traditionally had contact with the families needing special services are unaware of the other services available and unaware of the appropriate ways of making a referral to such services.

In some communities, pastoral groups, extension personnel, or community groups of informed citizens have assumed the responsibility of helping to put together a referral network that provides access to all the services available. Often, the network is organized as a result of developing the service directory.

The primary benefit of the directories is that they increase the likelihood that farmers will learn about the various assistance programs designed to help them. Another benefit is that policy makers are made aware of existing assistance programs. That could lead to substantial cost savings. Without assistance directories, it's more likely that duplicate assistance programs would be implemented by policy makers who are unaware that appropriate programs are already in place. Those benefits are reasons why an assistance directory should be a first step in responding to farmers' financial problems.

Emotional Support

Information obtained from a survey conducted in Missouri in the spring of 1985 and later the same year in New York indicates that families experiencing the loss of their farm and the transition out of agriculture experience depression (Heffernan, Graham). Many families indicated that they experienced these characteristics of depression: withdrawing from families and friends, increased physical aggressiveness, a sense of worthlessness, and the inability to think rationally or logically. The consequences for the family are often very negative when both husbands and wives experienced those characteristics.

A growing body of data implicating the increased rate of teenage pregnancy, the increased proportion of children from farm families in homes for runaways, and the increase in family abuse give evidence of the social costs to farm children resulting from their parents' depression. The long-term consequences of those social costs will probably be even greater than those resulting from suicides which often receive the most attention. Much notice has been made of the fact that in 1985, in Missouri, the suicide rate among farmers was twice that of the rest of the population.

Relatively new programs designed to respond to such problems in rural areas are being developed in many states and communities. Such efforts range from increasing the social and recreational activities in local communities to developing clinical mental health programs in rural areas. Two efforts that are between those extremes include the development of formal social support groups and mental health outreach programs. Formal social support group programs involve training group leaders who can facilitate the sharing of feelings and concerns with others. Some support groups are actually formal mental health therapy groups with a trained mental health worker present.

Programs such as one conducted by the Farm Resource Center in Illinois that involves eighteen trained professionals who meet

individuals in their homes or in other group settings throughout the state are also appearing. The mental health workers are to reach out to families who would not otherwise avail themselves of the mental health programs provided in a clinical setting. Those professionals are able to help stabilize an immediate crisis faced by a family, as well as to help connect the family with a larger network of services.

Hot lines that are operated either by a variety of government agencies, by farm organizations, or by other groups are also available in many states. Often those hot lines give information of a financial or legal nature, but they also frequently provide opportunities for individuals to express their feelings. Personnel who answer the phones for most hot lines have been trained to deal with emotional crises on the phone. Usually, such calls to hot lines, however, need to be followed up with locally based assistance. Thus, there is a real need to provide a local system supplement to the state or regional hot lines.

Providing mental health assistance may be expensive, but the long-term social cost of not providing such assistance will be even greater. For example, in the Missouri study, half of the former farm families have not found permanent, even adequately paid employment, and some researchers argue that most of that group of former farmers will not become productive members of society unless major assistance, including mental health services, is provided. Drawing on a community study of former miners, Janet Fitchen has also recently argued that the social cost of the current financial crisis may be incurred for generations.

Legal Assistance

Financially stressed farmers going through bankruptcy or foreclosure will generally require legal assistance. Unfortunately they may be unable to afford the fees associated with litigation. Therefore there is a need for programs that will allow financially stressed farmers to obtain the services of lawyers at little or no cost. There are various ways that can be accomplished.

In Illinois, some members of the state bar association have donated their services to stressed farmers. In other states, the legal fees of stressed farmers have been paid by the state governments or farm advocacy groups. Those actions have given financially strapped farmers access to answers on bankruptcy, foreclosure, appeal rights, income taxes, and other legal questions.

Eliminating the need for lawyers is another way to help farmers who cannot afford legal services. For example, a state could create a voluntary arbitration program that would be similar to the bankruptcy process. Under that program a state-appointed arbitrator would formulate a liquidation plan for farmers and lenders who voluntarily enter the process. The program accomplishes the same end as a bankruptcy proceeding while avoiding lawyer fees and court costs.

Financial Counseling

Educational programs to help farmers improve their management skills are useful responses to the financial problems of farmers. Such programs help farmers understand the financial realities of farming, and they show farmers how to use financial information to make informed decisions. In short, the programs teach farmers how to help themselves.

Financial management education will not save farmers who have reached the end of their financial rope. However, such programs can still benefit those who are leaving farming. The programs help the farmers understand why their lenders will not extend the credit they would need to stay in business. That will not make the lenders' decisions any more acceptable to exiting farmers. But helping farmers understand the lenders' positions could reduce hostility toward lenders and decrease the chance for violent confrontations.

Financial management education programs will benefit those farmers who can still obtain credit but are moving closer to bankruptcy. Such farmers will have the opportunity to identify their financial weaknesses and then determine whether those problems can be corrected. In some cases farmers will decide that the problems are beyond their control. Those farmers still benefit from information because they will at least know what to expect, and they can

develop an orderly plan for an exit instead of coping with an unanticipated credit refusal. Leaving farming is obviously not what the farmers desire, but a planned exit is clearly preferable to an unexpected foreclosure or bankruptcy.

In most cases financial management education programs will help farmers identify correctable financial problems. Farmers can then develop and implement financial plans that will keep them in business. Hence educational assistance should yield short-run benefits as farmers become more able to diagnose and correct problems that might otherwise cause their financial ruin.

Financial management education programs have long-run benefits as well. As farmers learn management concepts and begin to appreciate the need for detailed financial records, they should become better financial managers. As a result, the incidence of severe farm financial stress should diminish in the future because more farmers will have the expertise and information they need to identify and to correct financial problems before they become severe. Thus educational assistance is a preventive medicine that should pay dividends well into the future.

Agricultural policy makers have recognized the merits of offering financial management programs for farmers. In the last few years federal and state funds have been committed to those types of programs (Lins). Federal extension funds have typically been used as seed money to initiate such programs in many states, while state funds have been used to expand or continue the programs.

The emphasis of farm financial management education programs has varied from state to state. Some have focused on individual counseling while others have focused on group meetings. A number of states have used toll free hot line numbers to provide confidential financial counseling to stressed farmers. Hot lines typically provide answers to a caller's initial concerns, and they generally result in farmers receiving follow-up assistance from a financial adviser or counselor.

In some states there has been a concentrated effort to educate persons who could in turn help farmers become better financial managers. Those training sessions have been offered to county extension agents, agricultural lenders, lawyers, and others who may be working with financially stressed farmers. Those group meetings have greatly increased the number of persons who can offer financial advice to farmers, making it easier for farmers to find sources of meaningful financial counseling.

The recent demand for information on farm financial management has encouraged the use of new educational technologies. For example video cassettes have been developed for individual and group instruction in financial management. In addition microcomputer programs have been developed and distributed to help farmers in financial analysis and planning. Such technologies have been very useful educational tools, and it is likely they will be used more fully as educators learn how they can be used to help farmers diagnose and solve financial problems.

Financial management education for farmers will not cause farm financial stress to magically disappear. However educational programs will offer farmers an opportunity to help themselves in cases where financial problems can be corrected. Furthermore such programs should help farmers avoid severe financial stress in the future because they should help farmers understand that financial problems can and must be corrected before the farm business has suffered irreparable financial damage. Given those benefits farm financial management education programs should be continued and expanded.

Vocational Assistance

If farmers leave farming with few or no marketable skills they will be forced to compete for the limited number of jobs that require few skills and, at best, generate modest incomes. The increase in the supply of unskilled laborers in agricultural regions could result in higher rates of unemployment in the short run. Over time the higher unemployment could translate into lower wages for a majority of unskilled laborers in an area. Thus workers in agricultural regions who are already seeking jobs that require few skills could be hurt financially if a large number of farmers suddenly leave farming

and enter the unskilled labor market. That suggests that workers should be willing to support programs that would moderate the number of farmers entering the general labor market.

Vocational assistance is a program that could be used to moderate the number of farmers who enter the unskilled labor market. Under such a program farmers leaving farming, or considering such a move, could receive financial aid to cover some or all of the costs of attending universities or vocational institutions to develop skills that are in demand by today's most active employers. Such a program should help keep unemployment from rising as fewer farmers seek the limited number of labor-oriented jobs. Hence that program should indirectly benefit nonfarm workers because it should help keep displaced farmers out of the general labor market.

A vocational assistance program will directly benefit those farmers who are forced to leave farming and find a new vocation. In addition, such a program could be very useful to farmers who may be voluntarily or involuntarily leaving farming in the future. Farmers could continue farming and simultaneously develop skills that they would need to obtain a job if they someday left farming. That would let farmers reduce their risk exposure because it would allow them to improve their prospects for finding jobs if or when they left farming. Hence those programs represent a type of unemployment insurance.

Another potential benefit of vocational assistance for farmers is that it could cause some farmers to realize that they would be happier in a different career. Those individuals could benefit financially or mentally because they would move into jobs more closely matching their financial and intrinsic preferences. A voluntary exit of some farmers under such circumstances could also benefit those who stay in farming because fewer persons would be competing for the limited profits in the agricultural economy.

An additional benefit of offering vocational assistance to farmers is that some may be able to use the program to develop the skills they need for off-farm jobs to supplement their farm earnings. That would prevent the failure of some farm businesses in the short run and could increase the staying power of some farm businesses in the long run because farmers would be able to reduce their use of costly debt capital as they obtain equity capital in the form of off-farm earnings. The shift from debt capital financing to equity capital financing should improve the financial stability of some farming operations reducing the possibilities for future financial crises.

The merits of vocational programs for farmers have been recognized by agricultural policy makers at federal and state levels. As a result, displaced farmers are eligible to participate in some federal and state job training programs. However, little if anything is being done for those farmers who have not been forced out of agriculture, so some of the benefits are being lost. Therefore it seems desirable to offer such programs to farmers who have not yet been forced out of business to give them more options for solving the problems associated with financial stress.

Financial Assistance for Exiting Farmers

In many cases, farmers forced out of business are thrown into a relatively uncertain financial environment. They have typically depleted their cash resources trying to save their businesses. In addition, they cannot readily sell assets such as machinery or land to generate cash. As a result those farmers do not have ready access to the cash they will need to cover living expenses when they leave farming.

Given those financial uncertainties, it is no wonder that farmers are willing to accept credit and to continue operating at a loss. They know they can support their families if they stay in business, whereas if they leave farming, there are no such guarantees.

Agricultural policy makers have been under considerable pressure to implement credit assistance programs that would keep farmers in business. Before policy makers respond to that pressure they need to consider why farmers seek such assistance: a lack of programs to keep farmers from being thrown into uncertain financial situations if they

leave farming. Therefore policy makers could reduce or eliminate the need for farm credit assistance by developing programs to protect exiting farmers from extreme financial uncertainties. That fact was recognized by the Wisconsin Governor's Commission on Agriculture in the spring of 1985. That group of farm leaders recommended that the state implement a financial assistance program for farmers who voluntarily or involuntarily leave farming.

Providing financial assistance to exiting farmers will obviously benefit those who leave farming. In addition, that type of program would benefit those who remain in business by adding some short-run stability to farm equipment and land markets. If farmers receive financial assistance when they leave farming, they will not be forced to sell their farm assets immediately at distressed prices to obtain the cash needed to cover living expenses while they are unemployed. As a result, the supply of farm assets on the market should be moderated, which should stabilize the value of farm assets, preventing the financial stresses that remaining farmers would experience if farm asset values dropped dramatically in the short run.

Welfare payments are a form of financial assistance that could be used to keep exiting farmers out of precarious financial positions. However, it is likely that many farmers would not use such assistance because they would view those payments as "charity." Furthermore that program could be relatively costly even if a small number of farm families used it. Since welfare payments are likely to be socially unacceptable and financially infeasible, such a program is probably ill advised.

Transition loans are a form of financial assistance that could overcome the social and financial obstacles associated with welfare payments. Exiting farmers could be given affordable loans to meet their short-term cash needs. The farmers could repay the loans after they acquire off-farm work and liquidate their farm assets. Those loans would likely not be viewed as "charity" so such assistance would be more acceptable to farmers. In addition, most of the loan funds will eventually be recovered. Therefore the costs of a widely used transition loan program could be considerably less than a welfare payment program that was not widely used. Thus a transition loan program is probably preferable to welfare payments.

Implementation of a workable transition program requires attention to many details. For example the source of the loan funds must be identified, eligibility requirements must be formulated, and loan terms must be specified. The following sections consider each of those issues.

Since most farmers requesting transition loans will probably have low equity and earnings, commercial lenders would probably not be willing to supply the needed credit. Thus it is likely that a government institution will need to guarantee loans made by commercial lenders or make direct loans to exiting farmers. The latter alternative is probably least desirable because it would require a new agency that could be costly to create and maintain and difficult to eliminate once it was no longer needed. Furthermore since large amounts of capital could be needed to satisfy the credit needs of exiting farmers, making such loans would probably put severe strains on government treasuries. Therefore, it is probably more acceptable (less expensive) for a government institution to guarantee some portion (for example, 90 percent) of loans that exiting farmers receive from private sector lenders.

The amount of money that a family could borrow under the program would probably need to be limited to ensure that the program is not abused. That could be accomplished by limiting the amount of money a family could borrow in one year (for example, $15,000) and the number of years the family is eligible to receive loans (for example, two years). Such restrictions should encourage families to actively seek employment instead of using the program as a continual source of income.

Eligibility requirements should also consider the financial needs of the family. When a family starts earning an income equal to or exceeding a specified limit (for example, $16,000), it should not be eligible for transition loans. Furthermore the amount of money a family is eligible to borrow should be decreased as the family earns nonfarm income and reduces its need for financial

assistance. That could be accomplished by reducing the family's borrowing allowance by some specified percentage—say 50 percent—of the taxable income the family earned in the preceding year. That arrangement would tie loan eligibility to financial need and encourage families to seek employment, but it would not penalize persons for accepting jobs that would not cover all of their living expenses.

The repayment requirement for those loans must match the farmers' repayment abilities. Otherwise the program would simply turn financially stressed farmers into financially stressed nonfarm workers. Therefore the repayment period should be long enough (for example, fifteen years) to keep principal payments relatively low. Interest rates should not exceed some specified maximum (for example, 10 percent) or prevailing market rates. In addition, the government could bear all the interest costs while the farmers are in transition between farming and new jobs. Farmers should not be expected to start repaying the loans for at least one year after they are no longer eligible to receive transition loans. All of those measures should ensure that the loans are affordable for farmers in transition from farming to other jobs.

Some of the families who receive transition loans will have cash at their disposal after they liquidate their farm assets and pay off their creditors. Those families could be required to apply the sale proceeds to their transition loan balances. However, it may be desirable to specify some acceptable investment options and allow the families to decide which options they want to use. For example they could be allowed to purchase a house, or to put the capital into a savings fund monitored and controlled by the lender who is administering the transition loans. Prepaying the transition loan would be another option. Offering investment options rather than requiring loan prepayment may be desirable because it would give the borrowers some control over their financial situation. That should make the transition loan program more acceptable to farmers who would otherwise avoid it for fear of restricting their postfarm financial activities.

A number of other issues need to be addressed before a workable transition loan program can be implemented. Agricultural policy makers will have to be willing to endure a long and stressful discovery process if they want to develop a program that will keep exiting farmers from experiencing the financial problems associated with farm failures. However, if policy makers do not offer financial assistance programs to exiting farmers, they will be forced to go through similar stresses when they try to formulate programs to prevent the failure of farm businesses. Therefore policy makers should be no worse off considering financial assistance for exiting farmers. For that reason it seems logical for policy makers to focus on developing transition loan programs for exiting farmers.

Conclusion

For many years society has provided some farmers the financial resources needed to stay in business to avoid the problems associated with farm business failures. Society has not, however, eliminated or moderated the hardships farmers experience when their businesses fail. Thus, the need for farm financial assistance programs exists, in part, because of a lack of programs to help farm families avoid severe stress when they go out of business. Furthermore, the need will continue as long as there are no educational and social programs that would at least moderate the hardships of financially stressed farm families.

Social and educational programs designed to help farmers cope with financial and emotional problems are alternative farm financial assistance programs. Such programs would shield farm families from severe hardships and eliminate the need for expensive farm financial assistance programs. Given those desirable outcomes, educational and social programs for farmers seem to be logical and sound responses to the problems of financially stressed farmers.

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Conclusions and Research Implications

Warren F. Lee

The purposes of the symposium *Financial Stress in Agriculture: Issues and Implications* were to share recent information on the nature and extent of the farm financial problem and to evaluate private and public sector responses to farm financial stress. As revealed in the foregoing articles, the farm credit crisis is real. About one-fifth of the nation's commercial farmers are experiencing moderate to severe difficulty in servicing their debts, and those farmers owe nearly one-half of all farm sector debt. Hundreds of agricultural banks and farm credit system lending associations have been liquidated, and agricultural lenders will likely struggle with mounting loan losses for several more years. The effects of the farm sector recession are also rippling through the agribusiness sector and rural communities.

There is widespread agreement that the farm credit crisis is not a temporary, short-term phenomenon. Instead, it is a long-run adjustment to secular trends that calls for a massive downsizing of the industry. Downsizing involves a reduction in the labor force, disinvestment in depreciable capital, the removal of marginal lands from production, a major devaluation of farm sector assets, and a paydown or write-off of several billions of dollars of farm sector debt. Those adjustments will continue until factors of production in agriculture once again earn competitive returns.

The symposium participants identified a broad range of existing short-term transition policies and a few longer-term adjustment policies. Some policies—the 1986 Tax Reform Act is an example—appear to respond to the problem or at least correct policy errors of the past. Other policies, such as modified accounting rules for lenders, merely hide the problem or delay recognition of its consequences. Still other policies such as credit subsidies only aggravate the problem by slowing the resource adjustment process.

Warren F. Lee is a professor, Department of Agricultural Economics and Rural Sociology, The Ohio State University.

Research Implications

Some would argue that the farm credit crisis is no longer an important issue; it has moved out of the headlines, and many policies have been developed to assist financially pressed farmers. A review of the symposium papers suggests otherwise. The adjustment process has not yet run its course, and there are still many unanswered questions about the plight of farmers, the future structure of the agricultural lending industry, and the ripple effects on agribusiness and rural communities. Moreover, many of the policies in place need much more than a fine tuning. The following is a partial list of issues that need attention.

Improvements in the Agricultural Finance Data Base

Nearly everyone was surprised by the depth and the duration of the recession in agriculture. As Brake has observed, traditional data sources proved inadequate to measure the rapid deterioration in the financial positions of farmers and their lenders after 1981. Ad hoc, costly, and in some cases, poorly designed state and regional surveys were used to try to answer seemingly simple questions such as, "How many farmers are going out of business?" and "How much money do failing farmers owe?"

The Economic Research Service in the U.S. Department of Agriculture (USDA) should continue to play the key role in the collection, analysis, and dissemination of agricultural sector financial data in collaboration with the Federal Reserve Board,

the Farm Credit Administration, and the land-grant universities. We reiterate Brake's plea for continued exploration of conceptualization and data collection issues at both the micro and macro levels. The AAEA Task Force has recommended to the USDA that an advisory committee of data users be established to further that purpose.

The $39 billion "unexplained difference" between estimates of outstanding farm sector debt is a clear indication that the accuracy and timeliness of the farm sector financial data base need more attention. In particular, the data base needs to show the dynamics of adjustment. Financial data from early in the crisis emphasized debt-to-asset ratios without adequate consideration of cash flows and rates of return. Then, even as increased attention was being given to the latter indicators, the data were used only for presenting periodic pictures of numbers of farmers in the various "vulnerability cells." There was no emphasis on movement from cell to cell or on movement out of agriculture. Documentation of such changes is sorely needed, particularly descriptions of the process of being forced out and of the deterioration in asset values and returns that generate movement of farmers to more vulnerable situations.

The Impacts of Macroeconomic Policies on the Farm Sector

The agricultural boom in the 1970s was fueled by a set of macroeconomic policies that resulted in low real interest rates and a weak U.S. dollar. Such an environment created widespread expectations for continued growth in farm exports, incomes, and asset values. The shift to a tighter monetary policy and to large government deficits in the 1980s rendered those expectations erroneous. The farm asset markets reacted quickly and dramatically to the new environment. In real terms, nearly half of the year-end 1980 farm sector equity was written off within six years.

Considerable progress has been made in modeling farm sector financial conditions under alternative policy scenarios. From this symposium we learned that the farm sector will fare best in the long run under less stimulative fiscal and monetary policies along with farm policies that facilitate the adjustment to a smaller and more competitive farm sector; however, meaningful progress on the policy front continues to be stymied by disagreement about future conditions and by inconsistencies in policy goals. Resolution of those obstacles should be a high priority on the research agenda.

The Agricultural Credit Delivery System

The agricultural recession of the 1980s quickly revealed the vulnerability of specialized agricultural lenders, especially the Farm Credit System, the Farmers Home Administration (FmHA), and those small, rural banks with heavy concentrations of farm loans. There has also been renewed questioning of the proper role of public sector lending through FmHA, Commodity Credit Corporation (CCC), and the growing number of state farm credit programs.

The attention of agricultural finance research needs to shift from its current focus on short-run credit policies to a fundamental consideration of an agricultural credit delivery system of the future, both to lay a foundation as well as to minimize costly subsidies, bailouts, and regulatory gimmickry.

The agricultural credit delivery system of the future needs improved funding mechanisms, more broadly diversified asset portfolios, and better packaging of credit and credit related services for an increasingly diverse farmer clientele. Regulatory standards and procedures also need to be reexamined in light of numerous failures in recent years. So too does the legal framework within which lenders and defaulting borrowers resolve their problems. Such recent changes as foreclosure moratoria, mandatory mediation, and Chapter 12 of the Bankruptcy Code may significantly increase the cost of credit for farmers as lenders adjust their risk premiums.

Private Sector Responses

Amidst all of the attention that has been paid to failing farmers and lenders, one fact is often overlooked—the vast majority are still financially secure. Results of simulation studies reported at this symposium suggest that private sector responses such as asset sales with lease-backs or equity infusions into farm businesses and interest rate reductions or loan restructuring by lending institutions will be more effective in relieving

financial stress than public sector credit subsidies. We now need to go beyond the preliminary work to collect and analyze empirical data on real world applications of those strategies to evaluate obstacles to their use as well as to identify additional promising strategies.

Research on private sector responses might also include revisiting the economies of size issue. The current thinking is that the farm sector will become increasingly bimodal with a few, very large specialized firms accounting for most of the production and a large number of small part-time farmers. That trend is explained by production and marketing advantages accruing to large operations and the ability of part-time farmers to generate sufficient off-farm income to maintain operations that are only marginally profitable.

Recent experience suggests that there is greater financial stability among smaller, diversified, part-time farmers. Thus, financial variables need to be included in future economies of size studies. Risk responses by lenders may favor smaller firms, and the need for farmers to diversify their own asset portfolios may imply *financial* diseconomies of size.

Financial Linkages Among Farming, Agribusiness, and Rural Communities

From a national perspective, farmers and farming are not a major component of the economy compared with the total labor force and the gross national product. However, nearly one state out of four is significantly dependent on agriculture, and in hundreds of rural communities, farming and closely related sectors essentially make up the entire economic base. The ripple effects of the decline in the farm economy are just now emerging in the form of decreases in population, employment, and tax bases. Issues for research include the cost of losing viable rural towns, the cost of revitalizing them through creative business retention and expansion programs, and the savings from consolidating local government units to provide essential services.

Easing the Transition of Human Resources Out of Farming

The number of farmers forced out of business in the 1980s is small compared with the number of workers laid off in other declining industries such as steel, automobiles, and energy; however, the economic and social adjustments for displaced farmers seem to be comparatively greater than those facing laid-off factory workers. Our rural culture apparently carries with it a set of attitudes and perceptions that impose heavy self- and peer criticism of those who fail in farming. It also includes an ingrained reluctance on the part of farmers to seek welfare, counselling, or other social services. Effective delivery of those services is also difficult because failing farmers are widely dispersed and most social workers are unaccustomed to dealing with the unique problems of farmers and their families. Also, criteria for eligibility unduly emphasize assets rather than income or net worth.

As Brake has observed, we need to promote an "attitude adjustment" regarding failing farmers. Legal and self-imposed obstacles to using the social services safety net need to be removed. Financial failures in farming need to be viewed as business rather than human failures, and we need to realize that occupational mobility is a normal part of a competitive economic system.

A thorough evaluation of public policies affecting resource adjustments in agriculture is needed. We are spending billions of dollars each year to remove land from production and hundreds of millions more on credit subsidies that in most cases only delay the inevitable departure of financially pressed operators. Would it not be better to reallocate even a small fraction of those expenditures to direct financial aid for departing farmers? They and the industry may be better served if their exit was speeded up instead of delayed, as seems to be the case under existing programs.

Summary

Six issues are identified for increased attention within the profession: improvements in the agricultural finance data base, the impacts of macro policies, the agricultural credit delivery system, private sector responses, local financial market linkages, and the transition of people out of farming. Different, and probably longer, lists could be developed. The intent here is to

focus narrowly on the farm *credit* crisis—a highly visible symptom of the sector's real problem of worldwide excess capacity.

The identification of issues needing additional attention should not be interpreted as a criticism of past research efforts. The response of agricultural finance researchers to the recent deluge of requests for their services has been remarkable. As the crises unfolded, they responded with numerous articles, reports, presentations, and so on for their peers, policy makers, the press, and the general public. Collectively, they have provided a balanced and objective description of the situation and have contributed meaningful dialogue in the policy making process. Those efforts must be continued and enhanced.

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Guidelines for Submitting Manuscripts

We invite submission of manuscripts in agricultural finance, including methodological, empirical, historical, policy, or review-oriented works. Papers must be original in content. Submissions will be reviewed by agricultural finance professionals. The final decision of publication will be made by the editors.

State in a cover letter why the manuscript would interest readers of the *Review* and indicate whether the material has been published elsewhere. Please prepare manuscripts to conform to the following outline.

Title. Short and to the point, preferably not more than seven or eight words.

Abstract. No more than 100 words.

Key Words. Indicate main topics of the article.

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